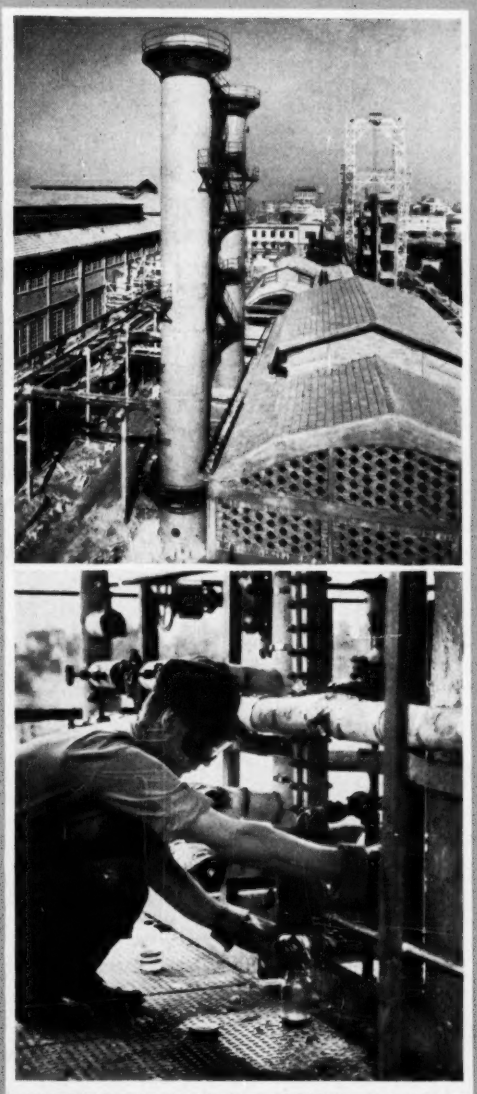
Chemical Week

June 13, 1953

Price 35 cents



Italy's long-battered chemical colossus battles U.S. producers on four continents . . . . . p. 18

Super-cortisones? Researchers size up new hyper-active chloro derivatives . . . . . p. 34

World premiere: Speculation's out, production's in as phenol-from-cumene plant rolls . . p. 50

It hefts, it bends, it saws; that underpins the surge in plastic pipe . . . . . p. 68

The green gimmick survives sneers; chlorophyll products are still riding high . . . . . p. 74

A McGRAW-HILL PUB



Looking *for sheep's wool under the sea*

THE "WOOL" taken from the ocean bottom is a *sponge*—Keys Sheep's Wool—native to our Florida coast. It's highly prized because it is said to hold more water than any other natural sponge of equal size.

Just as some sponges have greater capacity than others . . . so it is with lacquer solvents. MEK (methyl ethyl ketone) will hold more lacquer solids because it has superior *solvency*. This means that lacquers containing MEK offer greater covering power at the same spraying viscosity.

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MEK is one of the Shell "quality group" of solvents, which includes—among others—MIBK, MIBC, and IPA. Your Shell Chemical representative will be happy to discuss the advantages to be gained from using MEK in your formulations.

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Chemical Week

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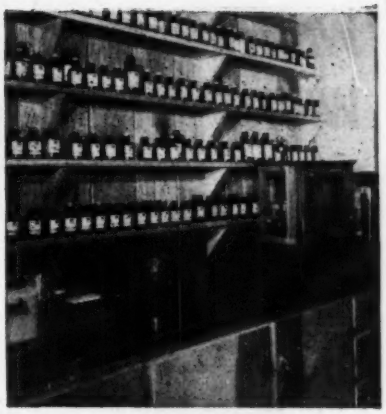
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The bright fluorescence of MDAC enhances and lends "life" to colors.

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★ **FILMS AND SHEETS**

MDAC overcomes yellow casts of label and overprint varnishes composed of zein, allyl starch, and polyamide and vinyl resins. It reduces the film tinting strength of these varnishes on paper.
In the presence of basic stabilizers, MDAC is an excellent whitener for clear vinyl sheets.

★ **SOAPS, DETERGENTS AND STARCHES**

Soaps, detergents, and starches, as well as the fabric on which they are used, are whitened and brightened by the addition of MDAC.

CARLISLE CHEMICAL WORKS, INC.

READING 15, OHIO

OPINION . . . . .

Astin Addendum

TO THE EDITOR: I wish to congratulate you for publishing an excellent description of the Astin-Weeks battery additive case (*Apr. 25*).

Your kind of moral standard in giving such a good write-up to this case is to be highly commended. You have shown a truly liberal attitude . . .

H. W. SCHNEIDER
President
Varniton Co.
Burbank, Calif.

Of Greater Importance

TO THE EDITOR: There are many features of the "Astin Case" beside which the merits of the battery additive AD-X2 become insignificant . . . What evidence has been made available falls into two classes: There is the testimonial evidence, which is overwhelmingly in favor of it and . . . apparently only a limited amount of scientific evidence, which at best does not allow an affirmative conclusion of merit to be drawn. However, after 20 years experience in testing battery additives one would not expect that many tests would be required to judge the value of a new one.

To the testimonial evidence no true scientist would grant any weight whatsoever. We are all too aware that the public will not only without question buy cancer cures, freckle removers and materials to burn up coal ash—if they are sufficiently touted—but will also supply golden testimonials for them.

On the dismissal of Astin the united pressure of scientific organizations has temporarily won a victory against the politicians who are willing to be guided by "the play of the market place." It is my opinion that the whole operation of the National Bureau of Standards can only benefit from a thorough study by a distinguished group of scientists who will weigh, each at its proper importance, the many factors involved in the activities of the Bureau . . . The comments made on this situation by one of your readers [Keith J. Laidler, *May 16*] should be balanced against the fact that his own organization has stated that his activities on behalf of AD-X2 have been entirely individual and do not have the official backing of the institution with which he is connected. In view of this it hardly pays to analyze the misstatements and faulty logic contained in his letter. The MIT report on which he leans heavily was characterized by the vice-president of MIT in the letter of transmittal accompanying it: ". . . there are no recommendations included in the report nor did any of our group arrive at any definite conclusions with respect to the commercial value of the product."

This statement . . . contains the most significant phase of the whole controversy.

As a consulting chemist, I have constantly to prepare reports, as in fact does every practicing chemist. It is obvious that public respect for such reports must suffer greatly when one of the worthiest names in American technical education is attached to a report that, in effect, does not involve work under conditions related to actual practice and does not warrant the drawing of any conclusions.

It is of the highest importance that scientists and technical men should be able to freely report their factual findings and present the conclusions that these findings warrant, free from any political or commercial pressure.

But it is of even greater importance that they should do their work in such a way that their results will be significant and their conclusions can be presented unequivocally.

KARL M. HERSTEIN
President
Herstein Laboratories, Inc.
New York, N. Y.

Hail, Colombia

TO THE EDITOR: How can we expect good Pan-American relations if our editors cannot even spell the name of our good neighbor, Colombia? (*May 23*) . . .

Why should we think that Columbia rules throughout the world? Let us remember Colombia . . .

WALTER E. LOBO
Director
Chemical Engineering Division
The M. W. Kellogg Co.
New York, N. Y.

Deceptive Averages

TO THE EDITOR: . . . I am glad that Dr. R. S. Jane, in his letter to you (*May 23*) had the courage to speak out against the juggling of figures

CW welcomes expressions of opinion from readers. The only requirements: that they be pertinent, as brief as possible.

Address all correspondence to: W. A. Jordan, Chemical Week, 330 W. 42nd St., New York 36, N.Y.

that some of the high tariff advocates bruit about . . . As he points out, the citing of "average duties" is meaningless and often misleading . . .

It reminds me of the fellow who drowned because he decided to walk across a river . . . because he had heard that its *average* depth was only two feet . . .

N. VASSALONE
Buffalo, N.Y.

Who's for Who?

TO THE EDITOR: . . . Your use of the English language is precise . . . and I suppose this is all to the good. But, it seems to me that all of us often indulge in conventional practices sometimes without much sense. . . . For instance, what sense if any does "whom" make. . . . It doesn't prevent ambiguity. . . .

I am about to start a crusade for the use of who—and who alone. . . .

R. L. MATTHEWS
Phoenix, Ariz.

Odious Odium

TO THE EDITOR: Your consensus of the baking industry regarding the "bread-softener shambles" (*May 9*) cannot express the bakers' opinion nearly so definitely as does the attached label from a loaf of bread I found in my own kitchen.

The emotion recorded publicly (probably — alas! — unknowingly) by this nationally known bread purveyor, is refreshing in its candor: "Odium Diacetate added to retard spoilage."

Need more be said?

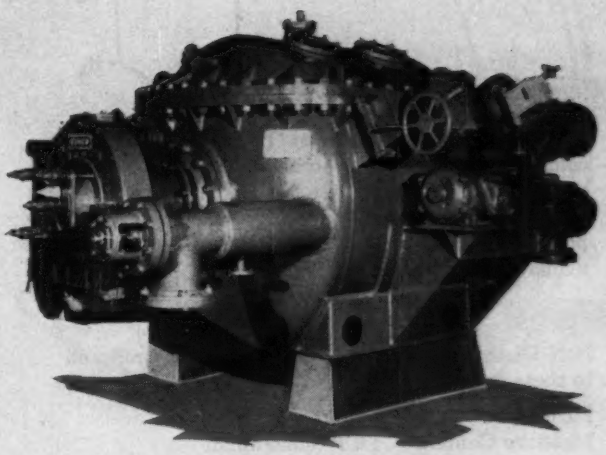
D. G. WEAVER
Advertising Manager
Acheson Colloids Co.
Port Huron, Mich.

Match Sequestrant, Soils

TO THE EDITOR: Your news article "Minor Nutrients Grow Up" (*Apr. 11*) was of great interest to us . . . particularly since we started experimental work in 1948 on the effect of our own sequestering agent, Teac-90, on the growth of plants with and without plant foods. We have obtained favorable results . . . which seem to parallel somewhat those obtained by the use of EDTA. Our product is, however, an organic salt structurally and by composition different from EDTA.

We have found that due to the variables present . . . soil characteristics, types of plants, weather, etc. . . . sometimes tests are not duplicated, but the over-all favorable results are conclusive. This is pointed out in your

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Showing one of Eimco's newest pressure filters equipped for dewatering and washing with automatic precision scraper blade advancing mechanisms.

Every Eimco Filter for vacuum or pressure operation, or combination of the two, is a custom built machine designed and constructed to meet the specific requirements of your process.

The machine pictured above is another typical example of Eimco custom built filter design. This filter is part of the flow sheet in a plant producing phenol, acetone and alphamethyl styrene. The purpose of the filter is to remove sodium crystals and small amounts of water and it was also necessary that the phenol in precoat cake be reduced to .05% washing with crude acetone and separating the strong and weak filtrates.

Eimco's testing and developing departments are staffed with experienced chemical and metallurgical engineers whose work with consulting engineering firms and the engineering departments of many producing companies has resulted in economies in operation and production of their product.

May we have an opportunity to consult with you and quote on your filter requirements?

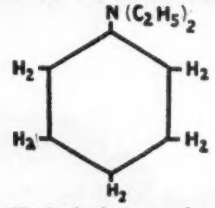
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N,N-Diethylcyclohexylamine Technical

M.W. 155.3



DESCRIPTIVE INFORMATION

N,N-Diethylcyclohexylamine Technical is a clear, colorless liquid which is soluble in ether and benzene and slightly soluble in water. Traces of cyclohexanone and N-ethylcyclohexylamine may be present as impurities. N,N-Diethylcyclohexylamine Technical is available in commercial quantities.

SPECIFICATIONS

N,N-Diethylcyclohexylamine Technical is produced to these specifications:

Purity . . . 98.5% minimum
Moisture Content . . . 0.1% maximum
Distillation Range . . . It shall distill 5 to 95 cc within 2.0°C., including the temperature 194.5°C., corrected to 760 mm.

SUGGESTED USES

This product is worth investigating as an intermediate for emulsifying agents and as an acid acceptor in organic reactions where pyridine is now being used. N,N-Diethylcyclohexylamine should also be of interest as a starting material for quaternary derivatives.

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A NEW INTERMEDIATE? We have the facilities to produce specific intermediates . . . perhaps one that will meet your exact requirements. Our technical men will be glad to study your problems and work with you in product development.

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BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

ORGANIC CHEMICALS DEPARTMENT

OPINION . . . . . .

article describing the striking results with EDTA complexes in Florida soils, as against inconclusive results obtained in Western soils . . .

It is possible that different types of sequestrants may perform differently under the same conditions. The selection of the proper agent or blend of agents for the existing conditions could be the answer . . .

FRANK GIBADLO
President
Process Chemical Specialties
Beverly, Mass.

More U.V. Reactions

TO THE EDITOR: Re the news article on reactions involving photosensitization (*May 30*) you may be interested to note that members of this firm have seen the reactors used to carry on three additional photosensitized reactions.

These are:

(1) chlorination of paraffin to form chlorinated paraffins,

(2) chlorination of methane to the various chlorinated methane derivatives,

(3) reaction of sulfur dioxide with chlorine and a hydrocarbon mixture to form the sulfonyl halide of the hydrocarbon in question. This latter is the well-known Reed reaction . . .

HERMAN W. ZABEL
Exec. Vice-President
Roger Williams, Inc.
New York, N.Y.

Stocking Stretchers

TO THE EDITOR: Read with interest your news article on specialties designed to lengthen the life of nylon stockings (*May 30*) in which you mention the various resin-based compositions and refer also to "one of the oldest products 'Nylon Dip' " . . . You suggest that it is not resin-based but say merely that it contains a "secret" ingredient . . .

It is sodium aluminum sulfate with a water-soluble blue dye. The dye gives it sales appeal . . . makes people believe they are bluing while they make the nylon tough . . . There is also another item called Run Proof, which is the same plus a little borax as water softener . . .

Some of the resin products, by the way, have run into trouble with allergies. It may be either the resin, the solvent or the detergent used . . .

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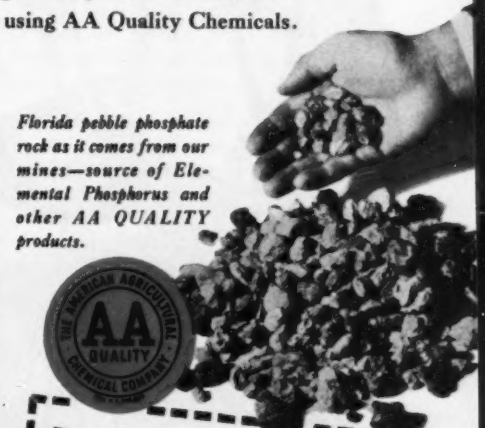
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Mighty midgets get too hot to function—without Armowax protection

There are an awful lot of parts in a modern television set, and most of them give off heat as they operate. When there's enough room to spread things out, that doesn't cause trouble. But when space is at a premium, as in television sets, proximity fuses, wristwatch radios, and many other modern inventions, parts must be reduced in size and carry increased current. Components with wax coatings, like condensers and resistors, get too hot to function—the protective coatings simply melt. Invariably breakdown follows.

Manufacturers searching for a solution have tried resins, with some success. But Armour has an answer which requires no change-over from wax. Armowax is a chemical with high melting characteristics and good compatabilities with waxes like Carnauba. It imparts these high melting qualities as well as water-repellency and resistance to chemical attack, to wax formulations, and it can be used as a Carnauba extender. It costs about half as much as Carnauba, too!

The high melting characteristics of Armowax have led to its application in many other fields. Incorporated into a powdered metal before forming, Armowax acts as a binder before fusing and also as a die lubricant. Auto polish formulations, wax emulsion coatings for paper, even water-repellent textile finishes are other possibilities. Send the coupon with your letterhead for a free sample and a booklet with further information.



All candles aren't alike—here's how Neo-Fat® 18-54 makes them different

Have you ever noticed how the wick of a candle bends as it burns? That's a carefully engineered trick—and the dripless, no-wick-cutting qualities of the candle depend on it. To make sure the wick does bend, one thread of it is pulled tighter than the rest. But also the wax of the candle must permit this wick action.

Armour produces double pressed stearic acid which is tailor-made for candle manufacture. Our crystallization method insures an extremely low ash-content—an important quality for candles, since it means wick action. Other users of double pressed stearic should look at this improved product, also. Armour is now using a process which guarantees consistently good stability. Whether you use stearic in cosmetics, buffing compounds, metallic stearates, or candles, stability during processing and in the end-product are essential. All known heat stability tests show that our double pressed stearic has the necessary stability (as well as color) to meet all industry's requirements. So send the coupon today with your letterhead for a free sample of this improved fatty acid.

An ugly duckling grows up—now tall oils yield valuable chemicals

Tall oils were regarded as waste by-products of paper manufacture for years. And, considering their extremely unpleasant odor, dark color and pitch-like consistency, no wonder nobody wanted them. But when they've been fractionally distilled by Armour, tall oils become valuable raw materials for paint, rubber, soap and other industries.

Crude tall oil is the cheapest organic acid available. A mixture of fatty acids, rosin acids and pitch, it can be fractionated to yield fatty acids of good color, slight odor and low rosin acid content. One of these products, Neo-Fat 42-12, is used in rubber compounding as a foaming agent and stabilizer for latex foam sponge. It is cheaper than the low titer Red Oil formerly used, and gives a better product. Neo-Fat 42-12 is also used in making jell, liquid and dry cleaning soaps, where its almost instantaneous saponification saves money, in modified alkyd resins, cutting oils, etc.



There are two other tall oil fractions. Neo-Fat 42-06 is produced by the redistillation of Neo-Fat 42-12 for lighter color and lower rosin acid content. And Neo-Fat 42-70 is a mixture of rosin acids and fatty acids, used in core oils, linoleum, rubber reclaiming, etc. Send the coupon with your letterhead for samples of these low-cost fatty acids.

Color-heat stability in alkyds with new low-cost fatty acid

The stability to heat and light of fatty acids used in the formulation of non-yellowing alkyd resins often poses a problem for the manufacturer. Long periods of storage and/or high temperature processing frequently cause the acid to lose its original light color. Naturally this darkens the finished alkyd, causing off-color shades. A fatty acid material that will not break down under processing, during storage, or after application, and that will still be available for low-cost alkyd finishes, has long been needed.

In answer to this problem the Armour Protective Coating Laboratory has developed Neo-Fat 125—a low-cost raw material for white, non-yellowing air dry or baked resin coatings. Its outstanding color-heat stability makes this acid impervious to time in storage, high temperature processing and exposure after application. It minimizes the chances of yellowing in white or pastel shades due to kitchen fumes, greases, soaps, etc. These properties have been proved by extensive field and laboratory tests, which resulted in the conclusion that this is an outstanding raw material for producing quality alkyds economically. Tests in your laboratory will convince you, so send the coupon with your letterhead for free samples and a copy of Technical Bulletin A-8, which contains complete technical information and suggested alkyd formulations.

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1355 West 31st Street, Chicago 9, Illinois

Please send me:

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- ☐ Double pressed stearic sample
- ☐ Neo-Fat 42-70 sample
- ☐ Neo-Fat 125 sample
- ☐ Neo-Fat 42-12 sample
- ☐ Neo-Fat 42-06 sample
- ☐ Technical Bulletin A-8

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NEW USE FOR AN "old salt..."

that saves money for cement makers*

Most cement is made by a process of "put 'n take." *Put* in lots of water to make the raw materials pumpable. Then, *take* all the water out to produce the dry, finished cement. The problem is to use as little water as possible and yet keep the mixture fluid. Victor Sodium Tripolyphosphate does the trick. Less than 1% of Victor "tri-poly" helps water carry far more raw cement particles. This enables cement makers actually to increase production around 10%, without adding new equipment . . . all this from the use of this versatile Victor chemical.

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Finding faster, lower cost, or better methods of producing better goods has been our objective for 55 years. The helping hand of Victor's research department and the excellence of Victor chemicals are well known to all industry, from agriculture to atomic energy . . . from food to pharmaceuticals. If you have a process or product problem that chemistry might solve, we suggest that your men get together with ours. Victor Chemical Works, 141 W. Jackson Blvd., Chicago 4, Ill. In the West: A. R. Maas Division, 4570 Ardine St., South Gate, Calif.

Note to Cement Makers: For details, write for technical bulletin V1-53.

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NEWSLETTER

You can expect a long delay on new "chemicals in food" legislation along the lines of the Delaney committee's recommendations. Congressman A. L. Miller (R., Neb.) has introduced two bills—the first on pesticides, the second on food additives—and he'll likely introduce a third bill, on cosmetics, within a few weeks. The outlook is, however, that all of them will probably be bottled up in committee for the remainder of the year.

By and large, pesticide producers back Miller's bill because it retains the Dept. of Agriculture as the enforcement agency. Previous legislative proposals would have shifted the enforcement job from Agriculture to the Food & Drug Administration, which, manufacturers feel, may be less understanding of their problems.

Despite Food & Drug's court victory whereby polyoxyethylene emulsifiers are banned from standard bread sold in interstate commerce, research is still going on that may eventually establish the safety of these food additives.

Last week Leroy Voris, executive secretary of the National Research Council's Food and Nutrition Board, said that vindication may come from any of several hundred projects now under way. The board's Food Protection Committee is actively reviewing all reports, is expected to issue its own report as soon as significant findings come to light.

Water supply in Texas is fundamentally sound, but there's enough of a pinch here and there to encourage conservation. The state legislature has now wound up its session, has passed eight conservation bills based on recommendations of Governor Shivers' 100-man advisory committee. Here's what the legislation does:

- Sets up a five-member pollution advisory council;
- Cancels all water permits not used for at least 10 years;
- Provides for temporary seasonal water permits;
- Gives the State Board of Water Engineers injunction powers; and raises the standards of the board;
- Clarifies existing laws on appropriation of state waters;
- Demands application in writing to the board for future water appropriations;
- Creates a nine-member State Water Resources Committee to make continuing studies and recommendations.

Perthane is a new word for your pesticide lexicon. Chemically it's 1,1-dichloro-2,2-bis(p-ethylphenyl)ethane, and it's an agricultural insecticide now being made in limited quantities by Rohm & Haas.

R&H plans to market the technical material (60¢/lb.), a dust base, a wettable powder, and an emulsion concentrate.

Now being analyzed is the first 15-ton batch of alumina from the U. S. Bureau of Mines' experimental plant at Laramie, Wyo. One of four units built (but never used) during World War II to develop nonbauxite aluminum, it was taken over by the bureau in 1951 for rehabilitation and completion. It has now started operating, will continue through June, 1954.

Raw material for the process is anorthosite, an abundant alumi-

num silicate mineral. It is sintered with limestone to yield alumina and Portland cement base. A day's operation yields 60-70 tons of alumina from 700 tons of raw material.

The first batch encouraged bureau personnel. It appeared to be of good quality, coarse of texture and low in silica.

Work will be started this year on the first prototype atomic power plant, if Rep. W. Sterling Cole (R., N. Y.), chairman of the Joint Committee on Atomic Energy, gets his way. He well may, too, since his committee has a big voice in atomic policy and appropriations.

Cole wants private industry to build the plant; if it won't, only then should the government do the job.

Two developments make Cole's impatience particularly timely: The "breeder" reactor in Idaho has just proved that it can produce as much fissionable material as it uses up—thus casting a new light on atomic economics; and the Atomic Energy Commission's huge Savannah River plant is already in partial operation—about a year ahead of schedule—which very probably will permit diversion of some atomic materials from bombs to power projects.

Next step in the Texas gas gathering tax fight is the U. S. Supreme Court. The state supreme court last week refused motions for a rehearing of the suit brought by pipeline companies, and now their attorneys have 90 days to apply to the highest court for review of the decision upholding the constitutionality of the tax.

If the tax is upheld, you can expect the next legislative session to raise it from its present nine-twentieths of a cent per 1,000 cu. ft. Other gas-producing states, too, will be strongly tempted to follow Texas' example; it's too good a revenue source to overlook.

Atomic workers are apparently harder to handle than atoms. Prospective members of President Eisenhower's new atomic energy labor-management relations panel are being called upon to settle a dispute even before they're officially appointed.

Some of them have been asked to mediate a tiff at the Portsmouth, O., atomic project. AFL carpenters there are striking for $2.80 an hour, the same rate paid on a federal housing project in the same city. But elsewhere in town the negotiated rate is $2.65—as it is on the atom job. Mediation or not, the carpenters are insistent on the $2.80 figure.

"Egg-head" unions—scientific, technical and professional organizations—are also involved in a squabble among themselves. Under an amendment to Taft-Hartley proposed by Rep. Kearns (R., Pa.), member of the House Labor Committee, such organizations would be allowed to discuss salaries, hours and working conditions with management.

Congress isn't likely to amend Taft-Hartley this year, but Kearns' proposal will probably be fought over from here on out (see Labor, pp. 22-23). The idea was suggested by the National Society of Professional Engineers; but it is bitterly assailed by the Engineers & Scientists of America, which asserts that only bona fide labor unions should be allowed to bargain collectively.

NSPE chapters usually get financial support from employers, list as members some management officials. Such a "union" would at present be declared employer-dominated, be ordered dissolved by NLRB. Kearns' bill would protect NSPE and similar groups from that action.

. . . The Editors

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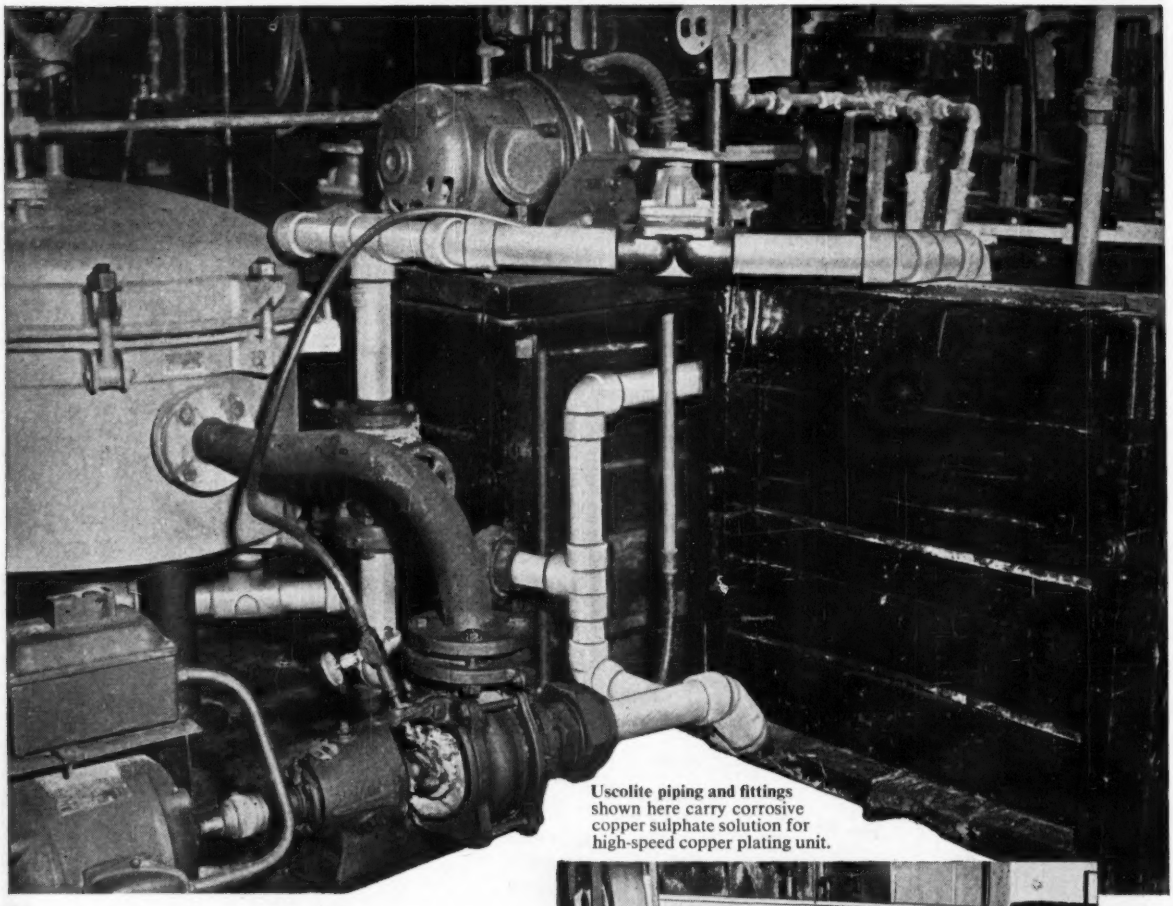
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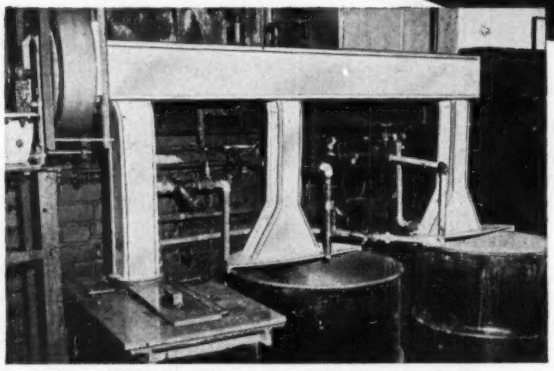
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BUSINESS & INDUSTRY . . .

Neck-Deep & Dripping

W. R. Grace & Co., which last September borrowed $35 million from insurance companies to make its big drive into the chemical field by forming Grace Chemical Co., swam in even further this week by completing negotiations to purchase Thurston Chemical Co. The deal will be handled on an exchange-of-stock basis at a ratio of one share of W. R. Grace common for every 2.229 shares of Thurston common. Minor legal details remain to be unscrambled; Thurston stockholders are expected to vote on the move soon.

Last year Grace Chemical made its first sally by undertaking construction of a $19-million nitrogen plant outside Memphis. Shortly thereafter it acquired a financial interest in Dewey & Almy Chemical Co., bought about 20% of the stock in Davison Chemical Corp. Latest feather: election of Charles E. Wilson last week as Grace Chemical's chairman of the board.

Thurston, which claimed net sales of over $7 million in 1952, turns out superphosphate and mixed fertilizers along with other agricultural chemicals. A family-held company until last October when almost half of its common stock was put up for sale, Thurston has plants in Atlas and Trenton, Mo., West Tulsa, Okla., and Lawrence, Kan., distributes its products in eight Midwestern states.



WIDE WORLD

GRACE CHEMICAL'S WILSON: First week in . . . takes over another chemical company.

Former President and Treasurer William R. Thurston is now slated to become president and director of Naco Fertilizer Co., W. Va., a wholly owned subsidiary of W. R. Grace and also a producer of mixed fertilizers, sulfuric acid, superphosphates.

Prognosis on Taxes

Name of Tax	Under Present Law:	Eisenhower Proposes:	Outlook in Congress
Excess Profits Tax	Expires June 30	Extend through Dec. 31	Very doubtful extender will pass
Corporate Income Tax	Maximum rate of 52% expires March 31, 1954; top rate then would be 47%	Extend 52% maximum rate indefinitely	Very doubtful extender will pass
Excise Taxes	Rates automatically drop on March 31, 1954, to pre-Korea levels	Let them drop	Reduction seems certain
Social Security Tax	Rate would increase by ½% on employer and employee Jan. 1	Postpone that increase indefinitely	Postponement is certain
Personal Income Tax	Rates automatically drop by 2%—10% on Jan. 1	Let them drop	Reduction is certain

CHEMICAL FIRMS and other growth industries are virtually holding their breath this week as President Eisenhower and the Congress head toward a showdown on tax reduction. Main points to be decided and their probable outcome are shown in the table above.

Both in the White House and on Capitol Hill, the Republicans are committed to cut taxes as soon as possible. The catch is in that last phrase: Congressional leaders, such as Chairman Dan Reed of the House Ways & Means Committee, insist that the time is now, while Ike and his fiscal advisers maintain that federal income must be held up until expenditures are pushed down.

And after sweating while the "temporary" tax policy is carved out, industry executives can anticipate a similar ordeal next January when Congress gets Eisenhower's recommendations for a long-range tax program, now being formulated under the direction of Treasury Undersecretary Marion Folsom.

Neoprene Verdict

It took a year of organizing effort and three National Labor Relations Board elections, but the International Chemical Workers Union (AFL) finally won bargaining rights at Du Pont's neoprene plant in Louisville, Ky.

This tenacity saga began last spring when ICWU organizers came in to test the strength of the Affiliated Chemical Workers of Kentucky, an independent union that was then the bargaining agent for the approximately 1,400 neoprene employees. ACWK was weakened by a split, with dissatisfied officers and members having formed a new independent group, Neoprene Craftsmen's Union.

Five unions competed in the first election last September, ICWU and NCU topping the field with 445 and 360 votes, respectively. In the runoff, NCU pushed ahead, 671 and 662, with ICWU protesting 12 votes. The Labor Board upheld the protest, and in the recent re-run of the runoff, ICWU held its 662 total while the NCU count slumped to 564.

Vastly encouraged by this second success at a large Du Pont plant (first was at Parlin, N.J.), ICWU President H. A. Bradley credited organizers Raymond Nicodemus and Laron Judd with major roles in the victory, indicated that he had other big jobs in store for them.



CAMPUS INTERVIEWS: ". . . a year-round activity, a scramble for top 10%."

Too Many for Too Few

Glamorous petrochemistry is the job seeker's choice for 1953.

Offers have rolled in to chemistry and chemical engineering graduates of all levels at the rate of three to ten per man.

Job future, country location, personality of company come before salary, immediate work.

Backed up against a stone wall in the technical manpower shortage this year, the chemical industry has gone all-out to coax fledgling chemists and chemical engineers into the fold.

Best estimates chalk up 11,000 engineers available to some 5,000 anticipating companies, with several big firms setting their sights on as many as 500 men apiece. The scramble is nationwide, common to companies of all sizes, all branches of the chemical industry. Said one undergraduate counselor to CW last week, referring to graduating chemists, "The situation is obvious, they've never had it so good. This is the peak, but unfortunately most of the boys think it's normal to be sought after. They're in for a rough disillusionment."

The Going Rate: The salary offered B.S. chemists without experience ranges generally from $340 to $425 throughout the nation, with oil companies offering the highest bait. Companies that have offered "$300 and up" aren't even getting students for interviews. An M.S. brings in $25-30/month more, but seemingly isn't commanding the bulk of the offers. Ph.D.'s are highest in demand, are getting from $500-685 depending on their special field, research problem and age. Draft deferment is sought more by Ph.D.'s than by B.S. holders; hence Atomic Energy Commission is getting a big proportion of the Ph.D. crop. (A quarter of Univ. of California's Ph.D.'s are going to the AEC).

The greatest shortage today in the chemical industry is of physical chemists; and opportunities for inorganic and analytical chemists are almost as wide. Any difficulty met in placing organic and biochemists can be attributed to the failure of the pharmaceutical houses to come up with a full share of job offers this year. Thus, in some cases organic or biochemists have had to sacrifice salary, location preferences or type of work, whereas the others can practically write their own tickets.

Regional preference is a growing consideration of job choosers. Californians run a close race with Texans when it comes to chauvinism. This factor even supersedes concern over size of the company chosen; in Texas, for example, almost all this year's graduates are ending up in large companies, because there are few small chemical companies in the area, "and the boys want Texas first."

In New York and Chicago, the heavy demands of oil companies are running barely ahead of plastics; students make their choices on the basis of job potential, opportunity for further education and impressions created by plant visits, rather than on immediate salary. Some 200 companies offered jobs in chemistry and chemical engineering to Columbia's grads this year; others were turned away "because there weren't enough students left to choose from." At one school in California, over two dozen companies couldn't get an interviewing date; on all campuses interviewing schedules were booked to capacity from mid-October on. Choice dates are already "taken" for next year.

Proportionally more graduating chemistry students are going on to graduate work this year; more chemical engineers are stopping at the B.S. level; and those that do go on plan, more often than not, to stop at the M.S. level. During the past three years there has been a gradual lowering in the salary differential between chemists and chemical engineers. At one time in California, a Ch.E. could get up to $35 more than his chemical counterpart; last year the imbalance was down to $15; now it barely exists.

To sweeten their lure, chemical companies are stepping up their fellowship and assistantship programs, increasing the number of summer jobs open to undergraduates, watching prospective Ph.D.'s closely with offers of help on graduate projects. Colleges predict that by 1954, the demand for top-rungers will be as strong as ever, but with technical men returning from Korea, they won't have to work down the ladder as far as they have this year.

No Stampede on Synthetic

Even though there's a large, assured and growing market for synthetic rubbers, it isn't likely that toes will be trampled and ribs crushed when the U.S. government opens the doors later this year to those who want to bid on the plants.

Assuming that the law directing the Reconstruction Finance Corp. to turn loose these plants will be along the lines of the bill introduced by Congressman Paul Shafer (*CW, June 6*), and that the market for all kinds of rubber will be as strong as is being predicted on all sides, it's a good bet that:

- Companies now operating these RFC-held plants will have a big advantage in bidding.
- The big rubber companies won't be allowed to buy too large a share of the synthetic industry.
- Biggest volume of synthetic rubber production will come from the sites where "integration" is most complete.

Monopoly 'Verboten': Most of the successful bidders probably will be found among the 19 companies now operating the plants, but Congressional sources indicate they've seen expressions of interest from some sizable companies—including chemical concerns—not now enrolled in the program.

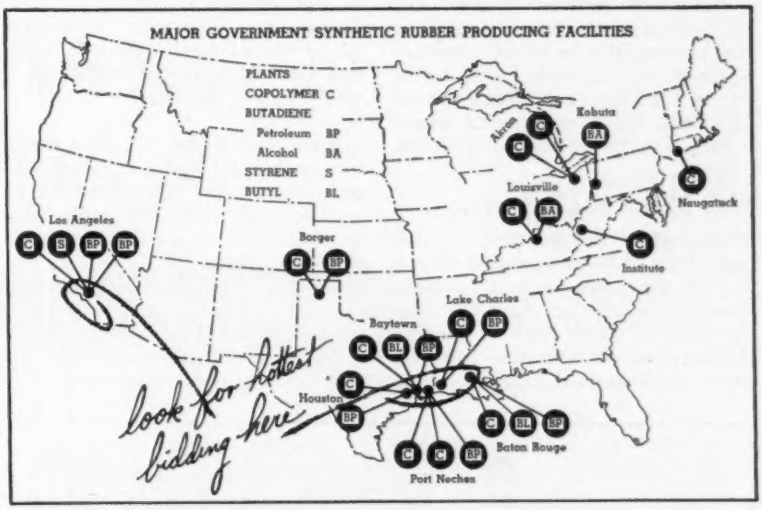
And the odds are good that the ultimate disposal plan will award one or more of the copolymer plants to a petroleum or chemical or other non-rubber company. Reason: government men, including congressmen, would like to make sure that someone other than the present "Big Five" rubber companies buys in to inject a new note of competition in the industry. Also, Congress wants to make sure that the small, independent user of rubber will get fair treatment, even in times of shortages.

For similar competitive reasons, you can look for the disposal people to resist selling to the "Big Five" rubber companies too many of the feedstock plants. Again, they'll want to avoid being accused of selling out to the big rubber companies.

Familiarity Helps: Most of the present operators are expected to try to stay in the business. And the odds are strongly in favor of the present operator, if he wants to do so, on being able to outbid almost anyone else for the plant he's now running.

There are a number of reasons for this advantage. For one thing, the present operator is known to have all the qualifications specified for a buyer. Also, he knows how much the plant is really worth, how much or little he'll want or need to put into it. Perhaps most important, many of these plants are integrated physically with facilities owned by the operator.

This is a terrific technologic, economic, and psychological disadvantage to the outsider when he begins to think about bidding for a plant that gets its feedstocks by pipeline from a competitor, or is dependent on a rival firm for steam, power, or other essentials.



UNCLE SAM'S RUBBER PLANTS: The biggest aren't always the best.

Most Coveted Plants: Butadiene, principal raw material in making GR-S general-purpose synthetic rubber, is produced most cheaply from petroleum. Accordingly, the most economical arrangement for turning out GR-S would be this: a petroleum refinery pumping its butylenes across the street to a butadiene plant, which in turn pipes its butadiene next door to a copolymer plant.

There are a number of these setups in the industry—and they're the real prizes. Because of this integration, it's likely to be hard to get outsiders to outbid the companies already tied into such an arrangement.

Another factor, along with economical location to feedstocks, is the variety of end-products that a given copolymer plant can produce. Some manufacture the more desirable "cold rubber" that gives longer tread wear, or the oil-extended rubbers that cut the cost per pound, or the synthetic latex that is booming because of the popularity of foam rubber products.

Neighborly Teamwork: One of the best of these setups is the group of facilities at Torrance, near Los Angeles. Midland Rubber's plant gets its butadiene from a nearby plant operated by Shell Chemical, which gets some of its raw materials from Standard Oil (Calif.). Styrene comes in by pipeline from the government plant operated by Dow Chemical. These plants produce cold rubber, latex, and oil-extended rubber in just about sufficient quantities to supply the West Coast market.

Other facilities that rate high are those in Houston, Port Neches and Baytown, Tex., and in Baton Rouge and Lake Charles, La. The copolymer plants are efficient, close to feedstock plants if not integrated with them, and most produce the variety of rubber products that are in demand.

Same goes for the units operated by Phillips Petroleum and Phillips Chemical at Borger, Tex.—except that the butadiene comes from butane, involving a higher-cost process.

Biggest Isn't Best: The two copolymer plants at Akron, O., are "nonstandard" works operating at higher cost, with feedstocks coming in by tank car. The biggest single plant in the system—the 122,000-ton GR-S plant operated by Goodrich at Institute, W. Va.—is one of the least desirable, produces no cold rubber.

There probably won't be much spirited bidding for the butadiene-from-alcohol plants now operated by Koppers and Union Carbide, as the process is much more costly than the one starting with petroleum. Chances are the government will keep these plants in mothballs for possible emergency use.

One "sleeper" may be butyl, the

rubber now used almost exclusively in inner tubes. It's by far the cheapest rubber to produce, and some insiders claim that it may become a hot competitor for both sidewalls and treads of tires. Other hints about choice new polymer discoveries have come from various companies that say they're waiting for the government to bow out of the business.

Neutrality Stressed: Shafer's bill (H.R. 5425), now being studied by the subcommittee he heads, prescribes a step-by-step timetable for selling the plants. It contains a provision to keep interested firms from having undue influence on the disposal commission.

COMPANIES . . . .

Northwestern Natural Gas Co. has bowed out of the race to pipe natural gas to the now unserved areas of Washington and Oregon. It was from the Pincher Creek field in southern Alberta that Northwestern had proposed to bring in the gas. Company officials are still seeking permission, however, to pipe gas to eastern Canada.

•

National Cylinder Gas Co. stockholders gave their official blessing to a plan for merger with the Girdler Corp., Louisville. Name of the surviving company: National Cylinder Gas Co., with Girdler forming a division of the merged corporations. Tube Turns, Inc., Louisville, heretofore jointly owned by National Cylinder and Girdler, is now operated as a wholly owned subsidiary.

•

International Nickel Co. of Canada reveals that the U.S. government has contracted to buy 120 million lbs. of metallic nickel and 100 million lbs. of electrolytic copper, deliveries to start next December. Shipments are scheduled to be completed by 1958.

•

Recent contracts for improvement and maintenance of buildings at the Army's Childersburg, Ala., ammunition plant hint that reactivation is not far off. Army requests for a stepped-up ammunition program are now pending in Congress, but rumpus over Air Force budget cuts may force Congressional action to delay official reopening by several months.

•

The Atomic Energy Commission's $78-million Feed Materials Production Center, Fernald, O., is nearing completion, with some portions of the plant already in operation. The completely integrated series of plants, whose function is to convert raw uranium ore into highly purified uranium metal in various shapes, is designed to reclaim essentially all of the uranium contained in the ores, as well as a substantial portion of the chemicals used in various process steps.

EXPANSION . . .

Fertilizer: Commercial Solvents Corp.'s $20-million chemical and fertilizer plant, Sterlington, La., is expected to go into partial operation by July, will be completely rolling by September. The new structure will double present plant capacity.

•

Sulfuric Acid: General Chemical Div., Allied Chemical & Dye Corp., will build a sulfuric acid plant at Painesville, O. Operation is expected late this year; the acid will be produced by the contact process. Allied's latest project is the second within recent weeks designed to boost sulfuric acid production; construction of another plant at Baton Rouge, La., began in May.

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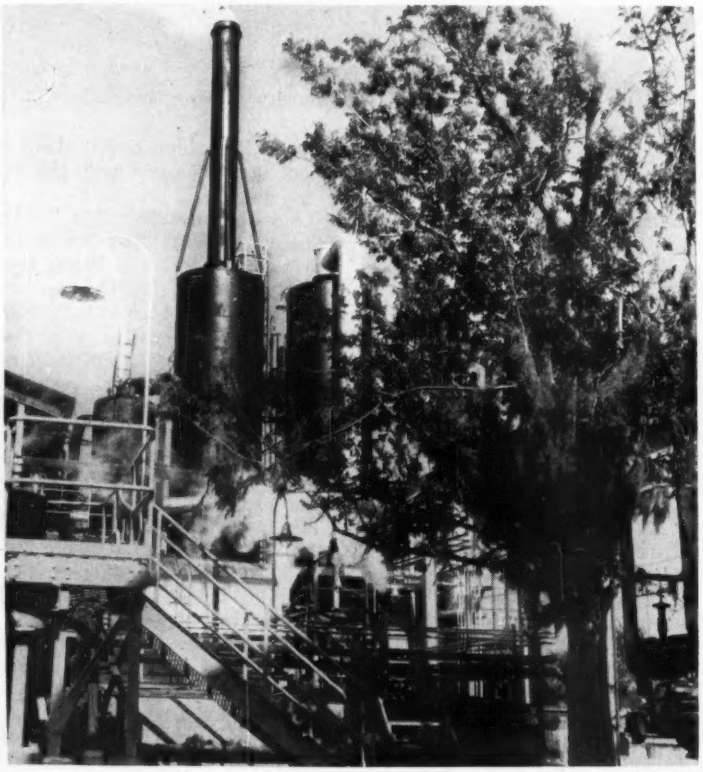
Plastic Tile: Hood Rubber Co., Watertown, Mass., has just broken ground for a $1.5-million plant to manufacture Goodrich Koroseal floor tile. Operation by early 1954 is anticipated.

•

High-Octane Gas: A site is being cleared at the Texas Co.'s Port Arthur works for the erection of a multimillion-dollar (estimated at $16 million) catalytic reforming unit. A contract for engineering design has been awarded to Universal Oil Products, Chicago. A government certificate of necessity was issued last year.

•

Ammonia: Utah Chemical Co. has told more about its proposed $18.8-million ammonia plant (*CW, June 6*). Catalytic Construction Co., Philadelphia, will build the plant. Utah is hopeful of utilizing natural gas expected to become available by 1954, allotted to central utilities companies from the newly developed Clear Creek field in Carbon County.

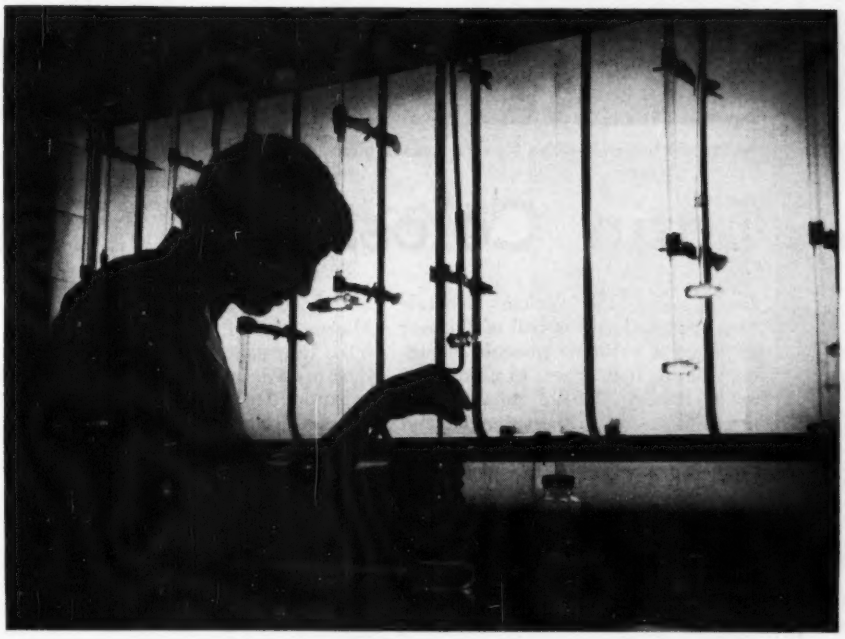


First Step In

AMERICAN CYANAMID'S Fortier plant, Jefferson Parish, La., this week took the first step in its over-all plan to turn out a line of nitrogen chemicals from natural gas. The event: production of sulfuric acid. Next in line for inauguration: 100-ton-a-day ammonium sulfate facilities, with ammonia, acetylene, hydrocyanic acid not far behind.

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Sodium Pyrophosphate Peroxide
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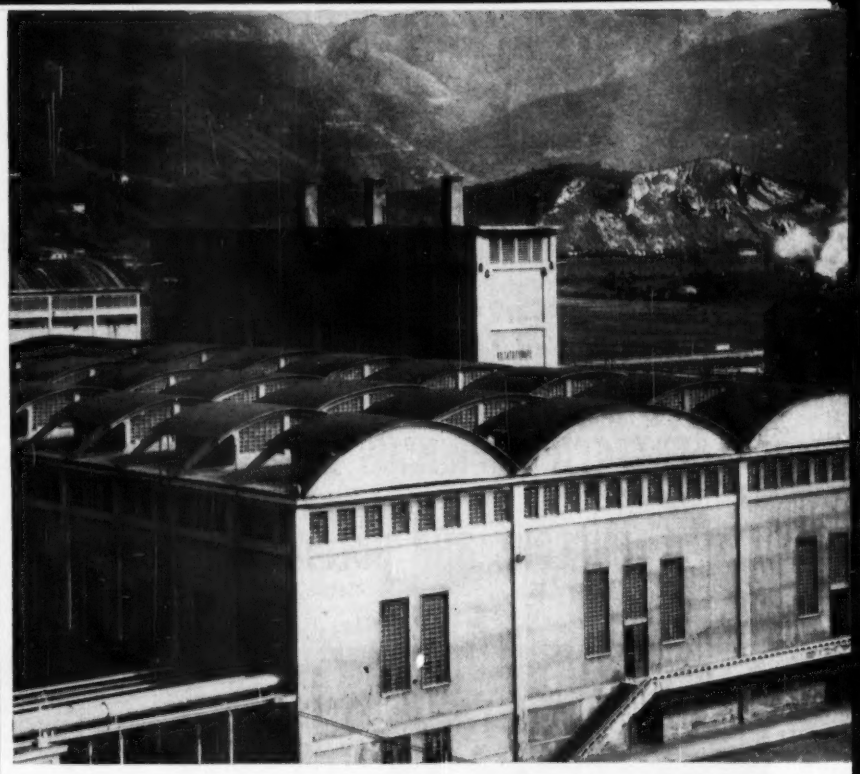
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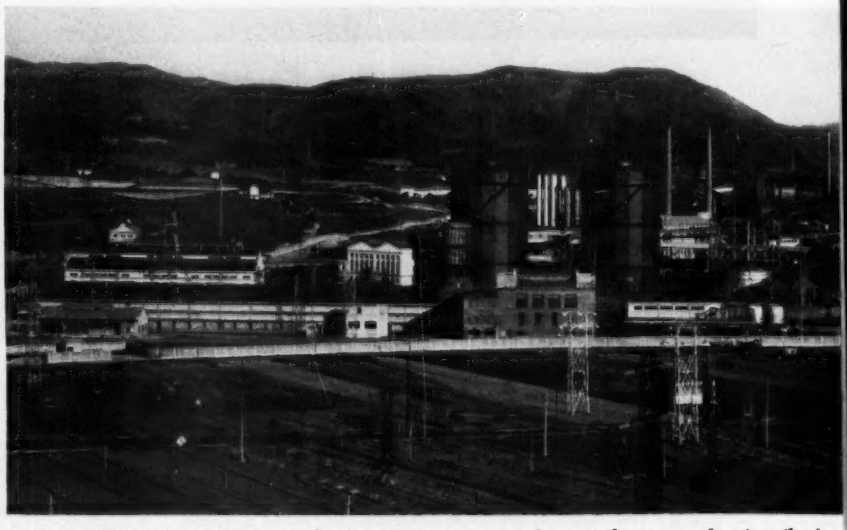


NITROGEN FIXATION: Carrara Avenza plant . . . connected to coke-oven works; utilizes

Latin Colossus — Driving

The rise of the Società Generale Montecatini since the end of the war has been a veritable phoenix emerging from its own ashes. In production (now around 65% of total Italian chemical output), in government and in research, its influence is swelling. Montecatini products read like an index to Italy's technical progress; its impress is even felt in recent agitation with the Italian government to modify existing patent legislation.* Management of Montecatini today still holds to certain traditional policy lines (first a drive on basic chemicals, then expansion to specialized activities), but sees itself primarily as a "production and progress organization." Seventy-five per cent of its employees are now also stockholders; total sales of

* Peculiarities in Italian law limit validity of patents to 15 years, exclude the patenting of manufacturing processes of medicines.



SAN GIUSEPPE DI CAIRO: Produces hydrogen starting from coal . . . used primarily in



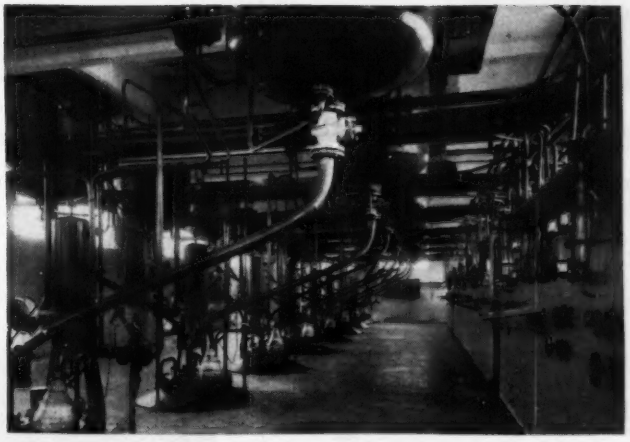
ases to turn out 20,000 metric tons of nitrogen annually.

on World Markets

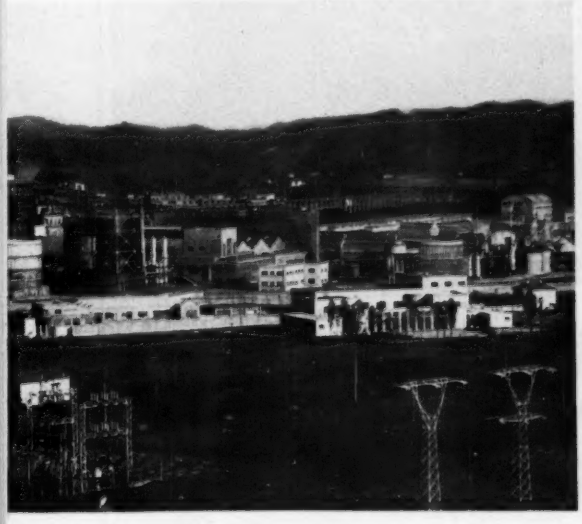
the Montecatini group are soaring over $300 million, 16% of which is garnered through exports.**

Ready and Willing: Officials now willingly agree that before the last war Italy was "a closed market—chemically," therefore that their company could be considered, "from cer-

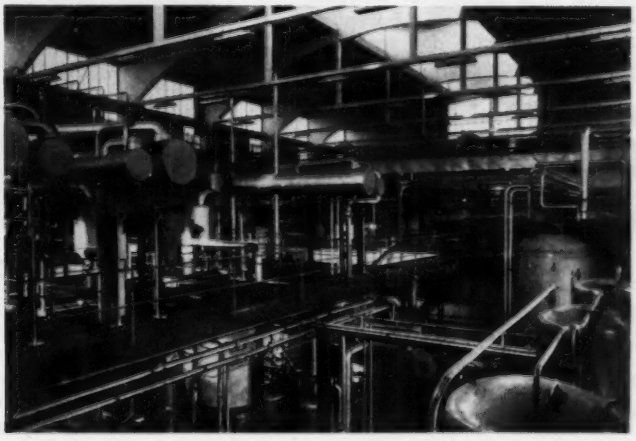
** One obvious advantage in export over domestic sales: fertilizer prices in Italy are subject to government control, are lower than in other European countries.



FERRARA WORKS: Part of nitrogen planning . . . gets acetylene derivatives, turns them into styrene, polystyrene resins.



synthesis of ammonia.



SETTIMO TORINESE WORKS: Now adding plants to manufacture antibiotics by fermentation . . .fruit of central biological labs, Milano.

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tain points of view and for some products, a monopolistic enterprise." But not so today, they aver. The big switch came with liberalization of Italian import laws—i.e., a decreased level in custom duties—Montecatini has been forced to meet foreign and domestic competition head-on. In pushing overseas sales (up 20% over 1951), and challenging U.S. producers on four continents, Montecatini is deliberately striking back at foreign chemical firms now exporting to Italy.

Latest Hot-Spots: In 1952, Italian production of pyrites reached an all-time high; Montecatini's contribution amounted to 86% of the total. Production of hydrogen from methane and the synthesis of ammonia was started at Novara on a commercial scale; early estimates chalk capacity up at around 27,000 tons annually. Nitrogen fixation has been wrapped up; a brand new plant at Ferrara is coming in with an annual output of 50,000 tons of nitrogen, bringing Montecatini's total capacity up to 208,000 tons/year—77% of total Italian production.

In the matter of sulfuric acid production, Montecatini now counts up returns from 49 plants with an average total annual output of a million tons of monohydrated acid. From sulfuric streams a hoard of inorganic, organic products—phosphate fertilizers and copper sulfate now heading the parade. (The 1951 figures record 1,196,000 tons of phosphate fertilizer from 40 plants alone.)

But today's emphasis is on calcium carbide and acetylene. Several plants involving production of acetylene from methane are due in soon. Other highlights: a wide range of insecticides, fungicides, inorganics, mineral pigments.

To supply hydrogen required in the synthesis of ammonia, Montecatini in recent months has built coke-oven plants; its plant at San Giuseppe di Cairo is one of the largest in Europe. By-products have led to synthetic dye-stuffs, ammonium sulfate, plastics production in many locations. Most promising: the nitrogen plant at Ferrara, equipped to use acetylene to make styrene, polystyrene resins. Coming up soon: polyethylene, dichloro-ethane, isopropanol, plasticizers, special solvents.

Intermediates Receive Attention: Montecatini dyestuffs today are produced by an associate company, A. C.N.A.—largest Italian firm in the field. Pharmaceuticals are handled by Farmaceutica Italia Co. (leading pharmaceutical house in Italy), whose latest



Pastoral Philanthropy

ALLIED CHEMICAL & DYE CORP.'s Solvay Process Div., Syracuse, N.Y., has solved its grass mowing problem, endeared itself to local herders. Sheep grazing on the steep bank of the plant's brine reservoir add a bucolic touch, keep grounds well manicured. Company officials find local rapport ample reward for grazing privileges; employees find pastoral scene refreshing.

A TESTED PROCESS FOR ETHYLENE OXIDE

LUMMUS *Presents*

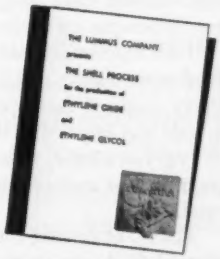
THE NEW SHELL PROCESS FOR THE PRODUCTION OF ETHYLENE OXIDE AND ETHYLENE GLYCOL.....

Now available through The Lummus Company are the Shell Development Company's processes for manufacture of ethylene oxide by direct oxidation of ethylene, and ethylene glycol by the hydration of the ethylene oxide.

At least five features of this Shell Process are particularly noteworthy:

- complete pilot plant testing has been done
- high yields result in optimum manufacturing costs
- unique instrumentation keeps all unit operations under close control
- waste disposal problems are considerably minimized
- unamortized product costs range from 8 to 10 cents per pound for ethylene oxide and 6½ to 8 cents per pound for ethylene glycol

Lummus is now prepared to design, engineer and construct Shell Process ethylene oxide and ethylene glycol plants —combining these features with Lummus' more than fifty years of experience in plant design and construction.



More details? Valuable information on ethylene oxide and ethylene glycol by the Shell Process has been developed by Lummus. Would you like a copy of this 12-page report? There's no obligation. Just drop us a note at Room 359, 385 Madison Avenue, New York 17.



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survived the Passage of Time . . .

In 1824, when Sir Edward Parry started out on his famous Third Expedition in search of the North West Passage, he undertook *two* dangerous missions.

One was the expedition itself.

The other . . . which some people in those days considered *even more dangerous* . . . was this: part of his food supply was put up in *tins!*

This represented one of the earliest efforts to preserve food in tin cans . . . and it worked out so well that Captain Parry credited these canned provisions with boosting the morale and improving the health of his men!

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And if *you* are setting sail on a business venture that calls for the use of tin or tin chemicals, get in touch with Metal & Thermit.

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Metal & Thermit Corporation has been headquarters for tin and tin chemicals for nearly half a century.

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B & I . . . . . .

expansion program has brought in an antibiotics plant producing penicillin, sulfonamides.

Special stress has been put on synthetic fibers in recent months. Petroleum cracking facilities are in the works; production of polyvinyl chloride has started at the Terni works; acrylonitrile fibers are in the offing. Development of plastics is Montecatini's latest pride. At Castellanza, expansion has just multiplied phenolic and urea-formaldehyde resin production many-fold, has stretched out to include melamine resins. All told, Montecatini's plastic production was up 50% last year.*

And There's More: Electricity is rated by company officials as "a fundamental raw material." The result: Montecatini now owns power stations; its total electrical consumption amounts to 11% of the entire Italian consumption; it stands as the largest private producer for internal consumption in the whole of Europe. A research laboratory at Novara (named Guido Donegani after Montecatini's founder) is one of the largest on the Continent.

Backing up its play for position in world markets, Montecatini is voicing unhappiness over financial, economic problems in Europe.

What's Coming: New investments made by Montecatini during the past five years top $190 million; major portions during 1952 were sunk in the group of works at Novara and Ferrara to produce synthetic nitrogen. Hydrocarbon expansion is the nominee for '53—e.g., acrylonitrile, plastics. (Estimated production of polyethylene this year should reach 4,000 tons; polyvinyl chloride, 7,000 tons.) Latest word from Milano: Montecatini will break into synthetic rubber production soon.

Imbalance of trade with the U.S. coupled with partial closure of British and French markets are problems besetting the Italian economy and Montecatini. To live, Italy must export. To survive, Montecatini must further its drive on world markets.

LABOR . . . . . .

Legislative Letup: With similar conditions prevailing throughout the entire manufacturing realm—fewer strikes, rising employment—there's been a general slowdown in the move to amend the Taft-Hartley law. Best bet now is that Congress will soft-pedal the subject; any major revision isn't likely to come before next year's elections.

* Other late expansions include: explosives, paints, glues, camphor.

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Damaged shipments are bad news any time. They're especially bad to Emulsol Corporation of Chicago. This company produces a variety of chemical emulsifiers which must be protected against "iron contamination." They are often shipped in Inland steel containers with one of our exclusive protective linings.

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According to Emulsol, "We're more than pleased with the job Inland linings do in protecting our emulsifiers."

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B & I . . . . . .

One point noticed during the House Labor Committee's hearings on the T-H amendment was that various organizations have different ideas on how to represent scientific and professional employees like chemists and engineers. These were among the viewpoints:

• "Employers should be prohibited from dealing with other than legitimate unions on the subject of wages, hours and working conditions . . . so-called 'sounding-board' organizations are not organized for the purpose of representing employees in collective bargaining but, to the contrary, have been established, with employer encouragement, to thwart union organization among the employees."—Engineers & Scientists of America.

• Congress should retain the T-H definition of "professional employee," and the provision that NLRB may not certify a bargaining unit of both professional and nonprofessional employees unless a majority of the professional employees vote for inclusion in the unit.—Engineers' Joint Council.

• The EJC recommendation is endorsed; and in addition, Congress should amend the law to provide "freedom of association" for professional personnel who do not choose to form collective bargaining units.—National Society of Professional Engineers.

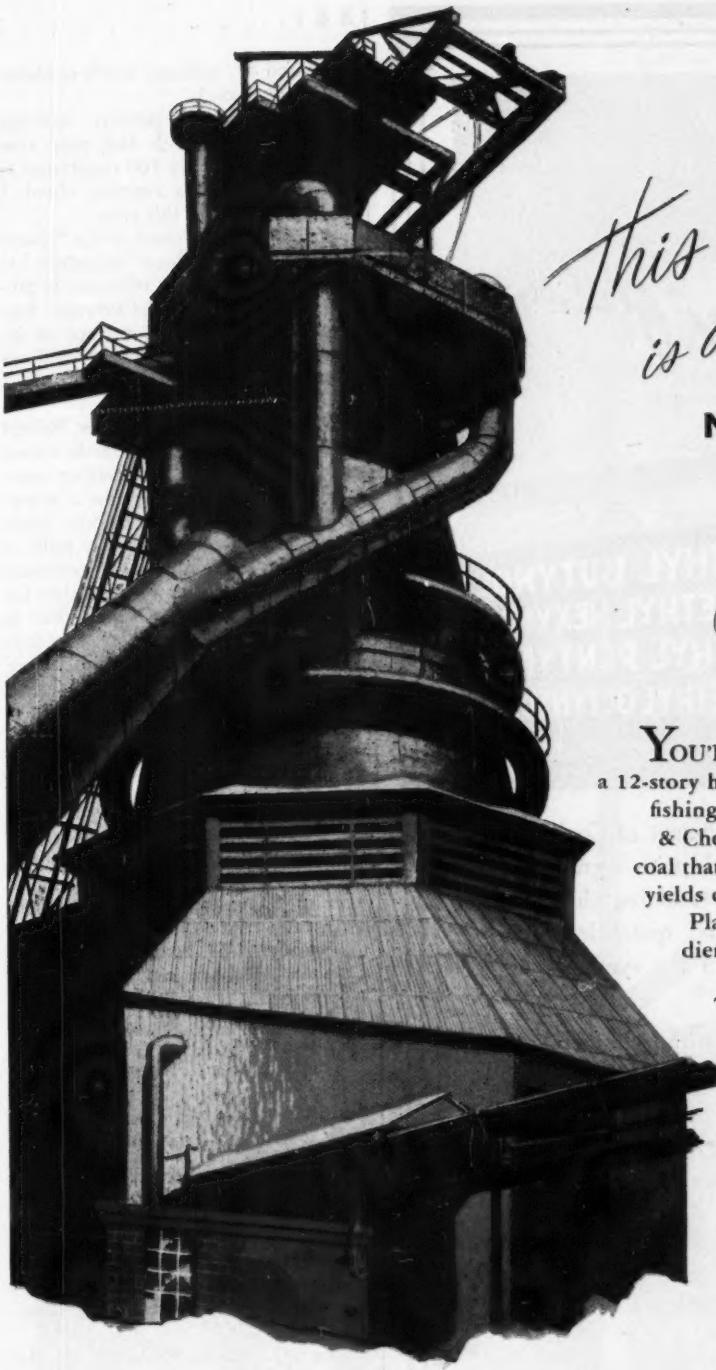
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Left Hand, Right Hand: Rivalry among "white-collar" organizations is less intense and less paradoxical than current feuding among the nonsalaried employees' labor unions. Right now, those federations seem to be following the principle of not letting the right hand know what the left hand is doing. While their affiliated unions (such as the AFL Chemical Workers and the CIO Gas, Coke & Chemical Workers) continue to battle each other on many fronts, an AFL and CIO "unity" committee is trying to work out a "no-raiding" agreement. In the first three months of this year, AFL and CIO unions opposed each other in 168 plant elections. The score: AFL 82, CIO 67.

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Stability Note: In the chemical industry, labor appears to be settling down for a calmer, more productive work-year in 1953, with both employment and wages going up. Latest labor statistics show:

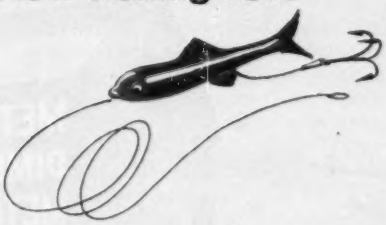
• Strikes are some 16% less frequent than during the early months of last year. (In 1952, only four other manufacturing industries had a better record in this respect than the chemical and allied industries. Even so, 1952 work stoppages chopped off an



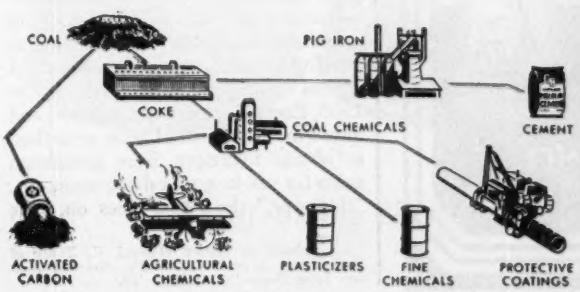
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estimated $37 millions' worth of chemical production.)

• Number of persons quitting chemical jobs—which last year rose to a peak of 2.5 per 100 employees in September—now is running about 1 or 1.1 each month this year.

• Total employment in the "chemical and allied products" industries has climbed to about 761,000—nearly 20,000 more than the 1952 average. Biggest individual increases came in industrial organic chemicals and in fertilizers.

•

Governor Acts: Louisiana Gov. Robert F. Kennon seems to have made a start on the ticklish task of getting companies and unions to work out a peaceable settlement of the bloody, nine-month strike in the two paper mills at Elizabeth. Kennon brought company and union representatives together for a day-and-a-half conference that is scheduled to resume next Monday. Big snag is still the question of rehiring all strikers at once or of taking them back on as they're needed.

NPA Revisited

Probably the first industry man to serve two "terms" as an official of the National Production Authority is Lyall Tracy,* industrial relations manager of Rayonier, Inc., of Hoquiam, Wash. After having served from Apr. '52 to Feb. '53 as head of NPA's Chemical, Rubber and Forest Products Bureau, Tracy is being recalled to help wind up NPA's remaining operations.

This will free Horace B. McCoy, acting NPA administrator, to work on plans for integrating some NPA functions within the Department of Commerce.

Admission of Remiss

Development of Russia's petrochemical industry has been progressing at an "intolerably" slow rate, according to the official Soviet government newspaper, *Izvestia*.

The U.S.S.R.'s Ministry of the Chemical Industry, says *Izvestia*, has paid insufficient attention to the development of chemical refining of petroleum gases, has lagged behind in developmental processing work. A typical example of inefficiency: in 1935, Russian scientists developed and tested on an industrial scale a method to obtain hydrogen from petroleum gases for use in synthesizing ammonia. "However," the paper goes on, "the

* Not related to Esso's Osgood V. Tracy of New York, director of NPA's chemical division from Sept. '51 to May '52.



For many years this non-toxic acid has served as the leading organic acidulant in foodstuffs ...beverages, candies, jellies, desserts. Now, more and more industries are finding Pfizer Citric Acid and its derivatives ideal for a variety of processes far-removed from the "kitchen."

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Since it contains one hydroxyl and three carboxyl groups, Citric Acid as an intermediate for organic synthesis offers many interesting possibilities. And, esters of Citric Acid...several of them marketed commercially by Pfizer...offer the plastics industry non-toxic plasticizers with a range of desirable characteristics.

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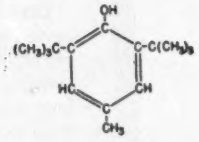
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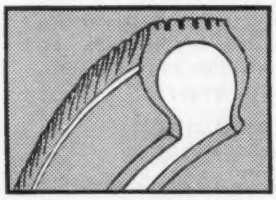
• Koppers 2, 6 Di-tert-butyl-para-cresol (DBPC) is a crystalline, tri-alkylated phenol, easily soluble in common organic solvents. Being a hindered phenol, it undergoes few of the reactions typical of unhindered phenols, such as phenol and meta-cresol.



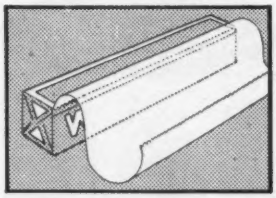
Koppers DBPC is an oxidation inhibitor that is non-staining and non-corrosive; it is insoluble in aqueous solutions of acids or alkalis. For the rubber, petroleum and waxed paper industries, DBPC has proved its value as a highly-effective antioxidant.

FOR FURTHER INFORMATION, write for your copy of Bulletin C-0-115. It describes in detail the properties, reactions and uses of DBPC.

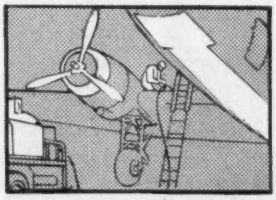
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RUBBER DBPC is useful as a "non-coloring" and a "non-staining" rubber antioxidant because it causes little or no discoloration of white or light-colored rubber products, even after prolonged exposure to light, heat and air.



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PETROLEUM DBPC is an excellent antioxidant for high-grade lubricating oils for low-temperature service such as spindle oils, greases, waxes, etc., and for such applications as turbine oils and transformer oils. DBPC is also available in a solution of toluene called Impruvol 33. It provides excellent stabilization of aviation gasolines and tetraethyl lead fuels.

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B & I. . . . . .

problem of organizing an ammonia fertilizer industry based on petroleum gas refining has still not been solved properly." A parallel instance in production of alcohol from petroleum gases: industrial installation for producing ethyl alcohol was inaugurated long before World War II, is still not turning out enough to meet Russia's needs.

Main snags are listed as inefficient liaison between the Ministry of the Chemical Industry and the Ministry of the Oil Industry, lack of zeal on the part of Russia's scientists to break through red tape, too few research bureaus, badly bungled planning.

LEGAL. . . . . .

Fanning-Out Move: Having scored a victory in a recent test case on alleged "counterfeiting" of its pentobarbital capsules (*CW Newsletter, May 9*), Abbott Laboratories now will go after other pharmacists suspected of substituting their own products in place of Abbott's "Nembutal." Pending are similar civil suits against three New York druggists accused of "palming off imitations and counterfeits on the public in the filling of prescriptions calling for (Nembutal), in fraud upon the medical and pharmacy professions, physicians' patients and the plaintiff." Abbott calls this "unfair competition" and "unlawfully alienating customers," is asking an injunction, seizure of "counterfeit" capsules, triple damages and costs.

•

About Face: After first taking a firm stand against shifting the new antitrust civil suit against five big oil companies (*CW Newsletter, Apr. 18*) out of U.S. District Court in Washington, the government's Antitrust Division suddenly reversed its stand and consented to the move, which had been requested by the oil companies. This "cartel case" now will be tried in New York City, with the next episode to be a skirmish over a government request for an order directing the companies to bring into court a raft of documents pertaining to their overseas transactions. The trial will be another duel between two lawyers who had leading roles in the big chemical antitrust suit against Imperial Chemical Industries and Du Pont. They are Leonard J. Emmerglick of the Department of Justice, and Gerhard Gesell, who represented Du Pont in the earlier case and is now retained by Standard Oil of New Jersey.

•

Whose Liability? Chemical and petrochemical companies undertaking expansion projects are keeping an eye on a lawsuit in Ashland, Ky., where

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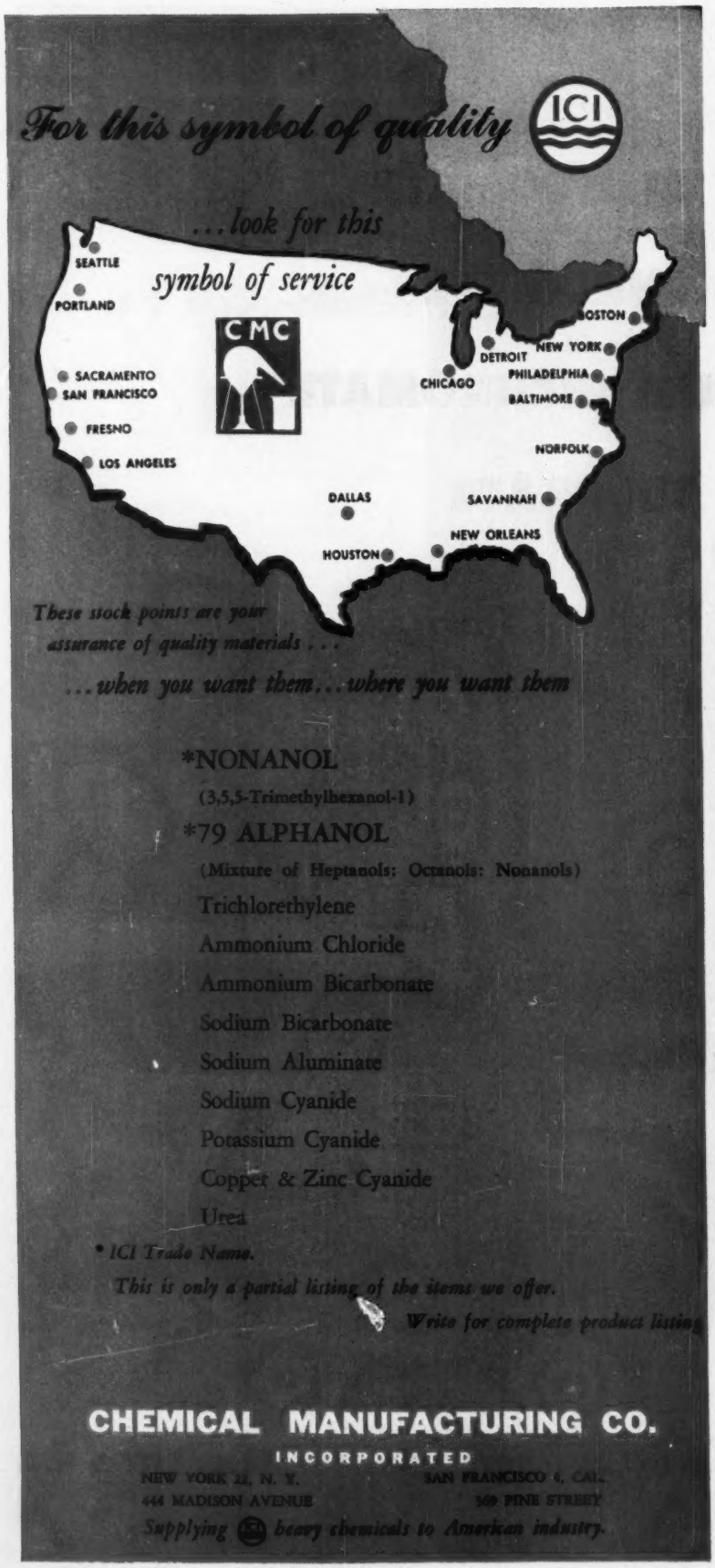
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NP122



B & I . . . . . .

a widow is suing Ashland Oil & Refining and the Kentucky & West Virginia Power Co. for $150,000. Her late husband, William Gordon Massie, Jr., an employee of a contracting firm, W. B. Fosson & Sons, was electrocuted when a crane boom struck an electric power line at Ashland's Leach refinery two months ago. Mrs. Massie asserts that her husband was killed as the result of negligence, that the power lines were "not properly insulated."

•

Debt Dispute: Two chemical specialty makers are embroiled in a lawsuit over an alleged debt of $92,176.14. The J. B. Williams Co. says in its petition that on Dec. 31, 1949, the Barbasol Co. gave R. B. Semler, Inc. a promissory note for that amount, payable on demand, that it acquired the note when it merged with Semler last year, and that Barbasol so far has not heeded the demand for payment. Williams wants judgment for the amount of the note plus $1,000 for attorneys' fees.

FOREIGN . . . .

Basic Chemicals/Israel: Plans to establish a $35-million basic chemical manufacturing industry in Israel have been formulated by Fertilizers and Chemicals, Ltd., Haifa. The project calls for production of nitrogen fertilizers, phosphates, sulfuric acid, soda ash, magnesia compounds.

•

Aureomycin/India: George V. Allen, U.S. Ambassador to India, dedicated a 5-million-rupee factory in Bombay for the production of aureomycin. The plant, first of its kind in India, can produce one million capsules of aureomycin daily, enough to meet the present requirements of the entire Far East.

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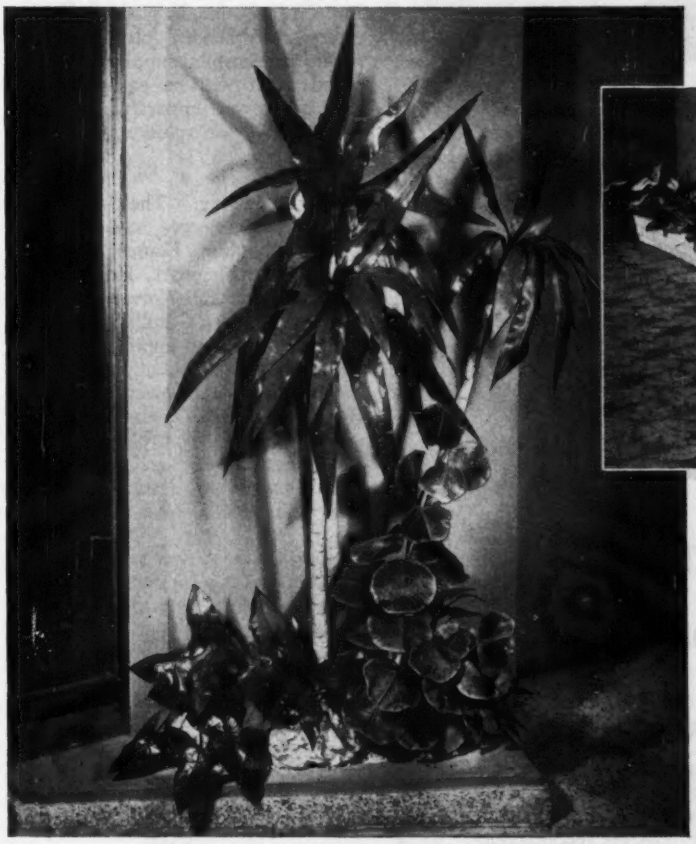
Terephthalic Acid/West Germany: The Imhausen-Werke G.m.b.H., Witten-Ruhr, is now building a plant to produce terephthalic acid. Capacity figures are not yet available.

•

Manganese/French West Africa: Negotiations are progressing between private French and American companies and French government services preliminary to setting up a mining company to explore manganese deposits in Gabon (French West Africa). U.S. Steel is reported to have agreed to buy 300,000 tons of manganese a year if and when commercial production starts. Best estimates predict 1960 as the earliest possible date for shipments of any sizable quantity.

News about

AMERICAN ANODE *materials*



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Chemical Products Division • 2191 West 110th St. • Cleveland 2, Ohio

B & I . . . . . .

Antibiotics/Philippines: Pfizer Overseas Inc. has sent an executive to the Philippines to assist Metro Drug Corp., Pfizer distributors, in planning a laboratory and packing plant for antibiotics and hospital supplies. The proposed plant will be equipped with antibiotic assay apparatus, will also prepare dextrose solution, other hospital supplies.

•

Drugs/Hongkong: The Hongkong Dept. of Commerce says that the United Kingdom, France, Germany, Japan, Italy, Denmark, Holland, Belgium, Canada and Norway will now release antibiotics, sulfa drugs and antimalarials for import into the Crown Colony. A condition is hung on the arrangement, however, that the Hongkong import licenses are endorsed "approved for controlled disposal," which include both local consumption and re-export to destinations other than Communist China and Macao.

•

Copper/Chile: A new plant at Chile Exploration Co.'s copper mine at Chuquicamata (Anaconda group) was officially inaugurated recently, will not be in actual production until the end of the year. It is intended to treat copper sulfide ores which will eventually replace the oxide ores. Increase in monthly production of fine copper will jump 3,000 tons.

KEY CHANGES . . .

George C. Miller: To president, Bakelite Co., division of Union Carbide and Carbon Corp., New York, N.Y.

Abbott K. Hamilton, Sydney T. Ellis: To members of the board, Commercial Solvents Corp., New York, N.Y.

Jan Oostermeyer: To member of the board, Food Machinery and Chemical Corp., San Jose, Calif.

L. Earle Arnow: To vice-president, Sharpe & Dohme Div., Merck & Co., Inc., Philadelphia, Pa.

Warren N. Burding: To vice-president, Lever Bros. Co., New York, N.Y.

Walter H. Prahl: To vice-president, Durez Plastics & Chemicals, Inc., North Tonawanda, N.Y.

Robert L. Taylor: To director of public relations, Mathieson Chemical Corp., Baltimore, Md.

KUDOS . . . . . .

Charles S. Munson: Chairman of the board, Air Reduction Co., and president, Manufacturing Chemists Assn., will receive the Chemical Industry Medal for 1953, Oct. 30, 1953.

J. W. T. Spinks: To president of the Chemical Institute of Canada for 1953-54.

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NEOPRENE LATEX CLOTHING



Need protection for your workers against abrasion, oils, greases, acids and alkalis? These *high quality* garments of Neoprene Latex offer you big money's worth 5 ways:

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4. They're styled to fit.
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SLEEVE MODEL 18NL

18" long. Weight 9½ oz. per pair. Seam on each sleeve absolutely waterproof. Strong, durable elastic at cuff and top. For all wet work (as in canneries), grinding, bench and acid operations.

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142DC APRON

42" long*. Recommended for use in the chemical and public utility industries, mining, dairies, meat packing.

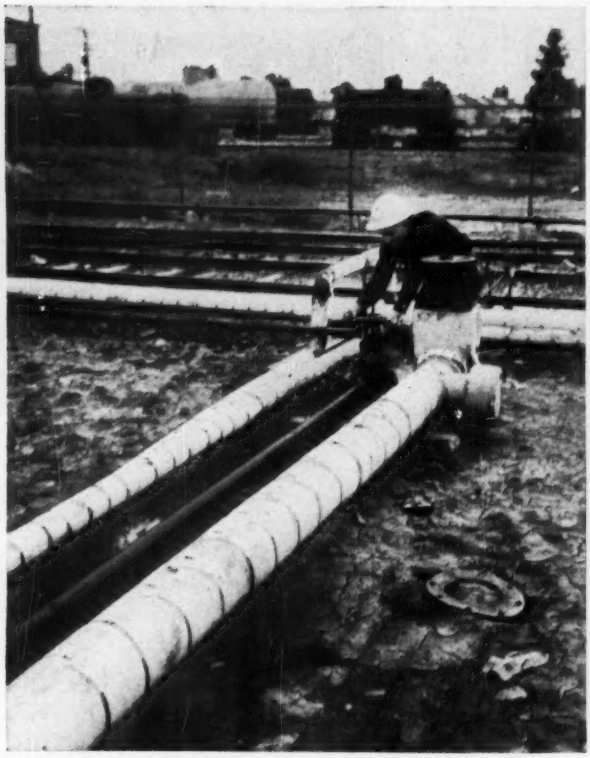
*Also available in 30", 36", and 48" lengths.

American Optical

SAFETY PRODUCTS DIVISION

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PRODUCTION.

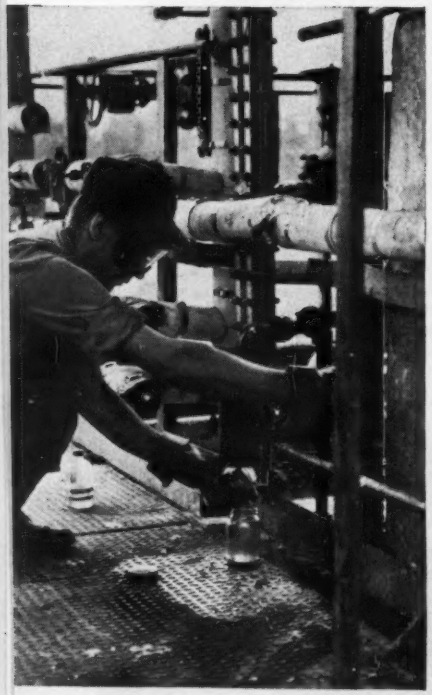


CUMENE, MADE FROM BENZENE and propylene at nearby British American Oil refinery, enters phenol plant via pipeline.

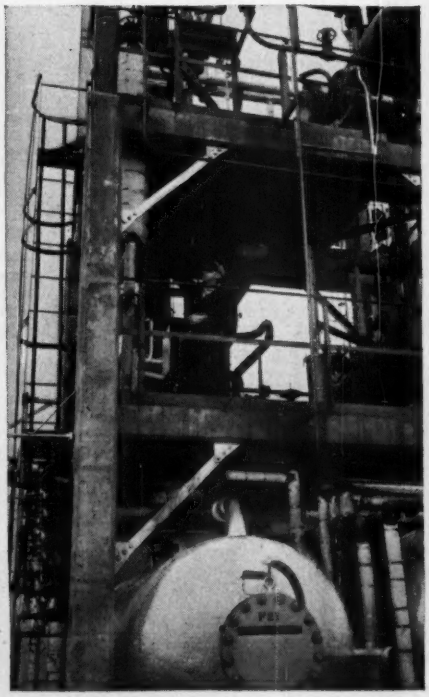


FIRST STEP IN THE NEW PLANT is oxidation with air of cumene to cumene hydroperoxide, one of the trickiest of process steps.

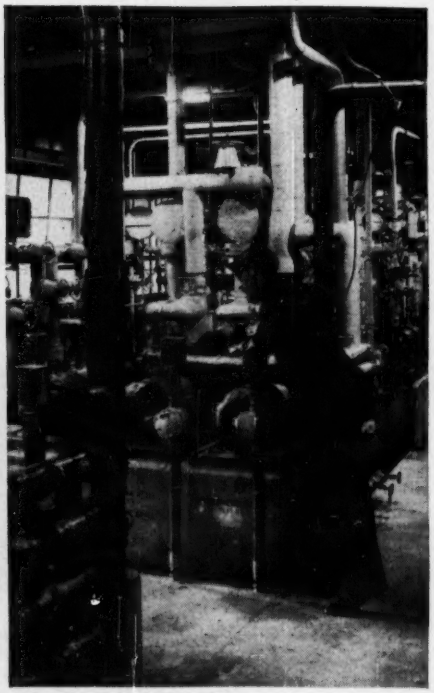
Lately a Plan, Now a Plant



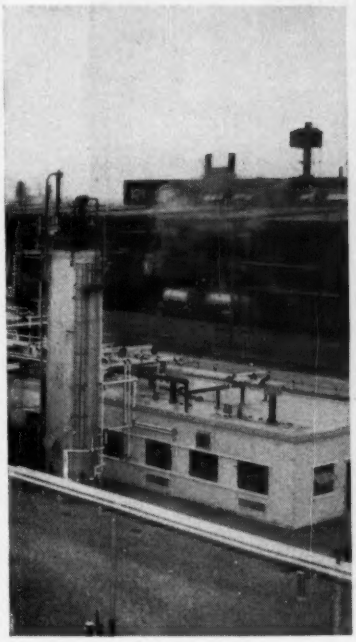
OPERATOR takes sample from cleavage reactor where the peroxide is split.

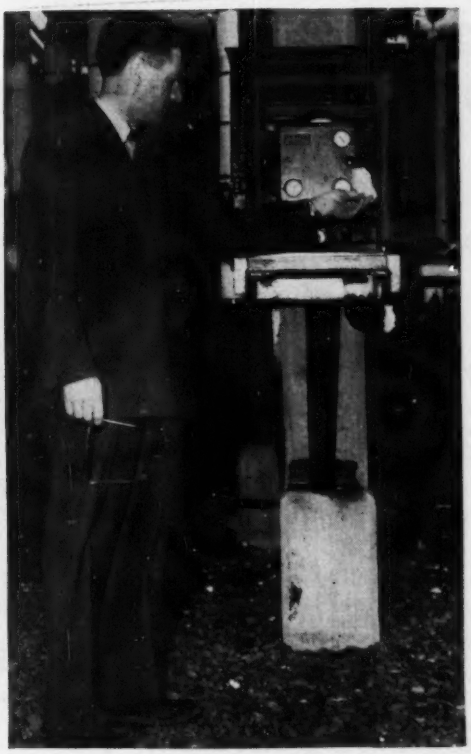


EXTRACTION unit separates out final traces of phenol as the sodium salt.



THE HEART OF THE PLANT, literally and figuratively, is the pump house.





PLANT MANAGER IRWIN makes a last minute check on the oxidizing controls.



GENERAL VIEW shows principal features of the process after the oxidation step. Outdoor construction—not usual in Canada—avoids undue concentration of vapor.

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ASTM mp °F	182.8
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Acid No.	15.
Sap. No.	70.
Furol. Visc. @ 210°F	87.

COMPLETE INFORMATION AND SAMPLES ARE AVAILABLE ON REQUEST.

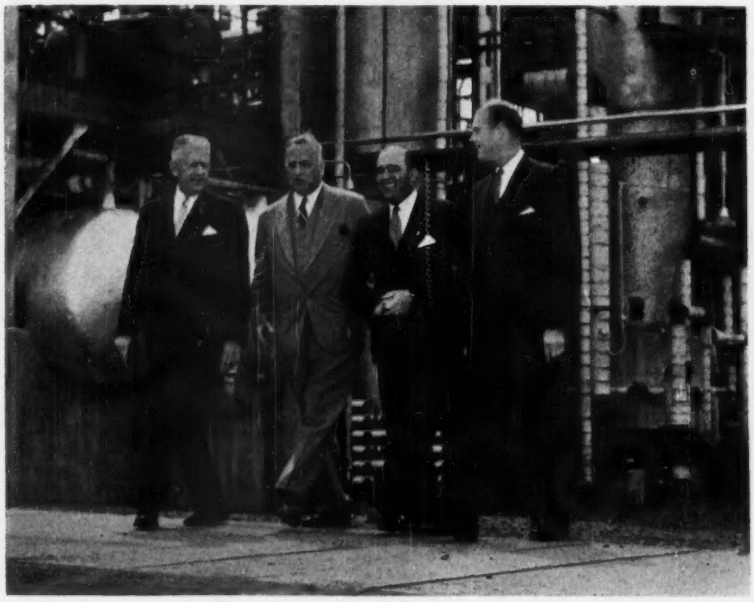
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ON HAND FOR OPENING DAY: Representatives of industry and government.*

STORY BEGINS ON PAGE 34

. . . Phenol from Cumene

MONTREAL is a large city occupying about one quarter of an island that's 30 miles long, between 7 and 10 miles wide. It has a population of over 1.6 million and lays claim to being the world's greatest grain shipping port as well as to being the second (to New York) most important port on the North American Continent. And Montreal East, which points with pride to its refineries whose capacity is bigger than that in any other refinery area in Canada, this week has another boast: it's the site of the world's only operating phenol-from-cumene plant.

The new plant—which also happens to be the first synthetic phenol plant in Canada—is the proud property of B.A.-Shawinigan, Ltd., a joint venture of the British American Oil Co. Ltd., and Shawinigan Chemicals Ltd. It was officially declared onstream the last Wednesday in May when Robert H. Winters, Canada's Minister of Resources and Development pushed a button. But bringing a plant of that type up to capacity is a delicate operation and chances are it will be a while yet before the plant hits its rated annual stride of 13 million lbs. of phenol and 8 million lbs. of acetone.

For American chemical men, the significance of the plant lies in the fact that it's employing a new process for an important industrial chemical and that similar methods are scheduled for at least three plants now being built in the U.S. Originally, the process attracted attention as a means of bypassing sulfur and chlorine in the manufacture of phenol. But the economics of the new route apparently stack up favorably against those of existing ones.†

Actually, the process used in the B.A.-Shawinigan plant represents the efforts of two companies. Hercules Powder Co. developed phenol from cumene as the culmination of a long-range research program carried on during the last 15 years. Concurrently, however, The Distillers Co., Ltd. in England developed an essentially equivalent method, and the Canadian plant will operate under license from both Hercules and Distillers. (Hercules has acquired the U.S. patents and patent applications of the English company and has licensed U.S. companies under the combined Hercules-Distillers developments.)

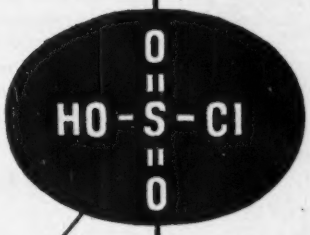
Construction of the phenol plant

† For an evaluation of the economies of the process and a list of plants employing it, cf. report by Nieuwenhuis, *CW, May 2, '53.*

* Shown making a plant tour are (*l. to r.*): M. S. Beringer, chairman of the board of British American Oil and vice-president of B. A.-Shawinigan Ltd.; V. G. Bartram, president of B. A.-Shawinigan Ltd. and of Shawinigan Chemicals Ltd.; Robert Winters, Canada's Minister of Resources and Development; and J. A. Loep, resident manager of the Canadian Kellogg Co.

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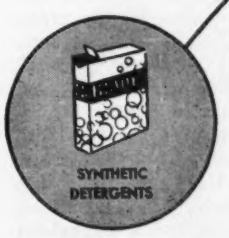
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For Sulfation . . .

$R-O-SO_3H$





Readily transportable, Du Pont Chlorosulfonic Acid offers manufacturers an exceptionally convenient and efficient means of sulfating and chlorosulfonating organic compounds.

For sulfation, theoretical quantities *without* an excess of acid are usually sufficient—resulting in important advantages over oleum or sulfuric methods, including less char formation. Chlorosulfonic acid gives a purer finished product . . . the hydrogen chloride liberated during reaction passes off freely as a gas. Sulfation with chlorosulfonic acid in the manufacture of synthetic detergents is widely used. Due to the trend toward lower inorganic sulfate content in alcohol sulfates, chlorosulfonic acid is finding ever-increasing use as a sulfating agent.

Important physical properties of this acid are:

Specific Gravity	1.752
Boiling Point	311°F.
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Specific Heat	0.282 BTU/lb./°F. between 59°F. and 176°F.
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EBONOL "C" — Converts cuprous oxide on copper alloys to cupric oxide to accomplish fast cleaning of scaled copper alloys without etching.

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ACTANE 33 — A dispersing agent added to acid pickles to remove colloidal and siliceous films from metals. Insures brighter and more adherent electrodeposits. Also an additive to sulphuric acid pickles to promote faster pickling of stainless steel and titanium. Can be used with sulphuric acid pickles to remove trapped silica in castings.

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ELECTROPLATING CHEMICALS

PRODUCTION . . . . .

was handled by the M. W. Kellogg Co. Cumene is produced in the neighboring refinery of British American Oil, then piped to the B. A.-Shawinigan plant. There, it's oxidized with air to cumene hydroperoxide, which in the presence of sulfuric acid disproportionates in the "cleavage reactor" to phenol and acetone. Smaller amounts of by-products are also formed. In fact, when the plant reaches capacity, it is expected to turn out 1 million lbs. of α-methylstyrene and "several hundred thousand" pounds of acetophenone and mesityl oxide.

EQUIPMENT . . . .

Versatile Recorder: In addition to continuously recording up to six measurements of temperature, flow or conductivity on a single chart, declares The Foxboro Co. (Foxboro, Mass.), its new Multi-Record Dynalog Recorder can be made to actuate alarm systems and control process variables by affixing Rotax mechanisms. An illustrated technical information sheet is currently available.

•

Redesigned Galvanometer: General Electric Co. (Schenectady, N.Y.) has come out with a redesigned line of portable galvanometers. Useful in laboratory or factory for measuring low currents or voltages, the instruments feature a new tilted scale with hairline index and spotlight.

•

New Materials: Quantity production of its Simplex ferrochrome was the promise of Union Carbide as it recently fired the fourth (of eight planned) furnaces in its Marietta (O.) plant. Simplex ferrochrome, which is produced in the form of pellets, is a chrome alloy with a carbon content as low as 0.01%. Until recently, it has been available only in small quantities, is now undergoing tests throughout the steel industry. It should, says Union Carbide, mean economies in the production of extra-low-carbon stainless, also make for greater recovery of chromium in the production of all grades of stainless.

• From Minnesota Mining & Manufacturing Co. (Minneapolis) comes word of its new tape that can be used as a weatherproof, watertight seal. It is not resistant, however, to oil, gasoline or other solvents. Made of fabric-reinforced synthetic rubber and tagged EC-1202, the sealer is applied by laying the tape on the first surface before riveting, screwing or bolting the second surface to it.

• The American Felt Co. (Glenville, Conn.) has added dynel filter



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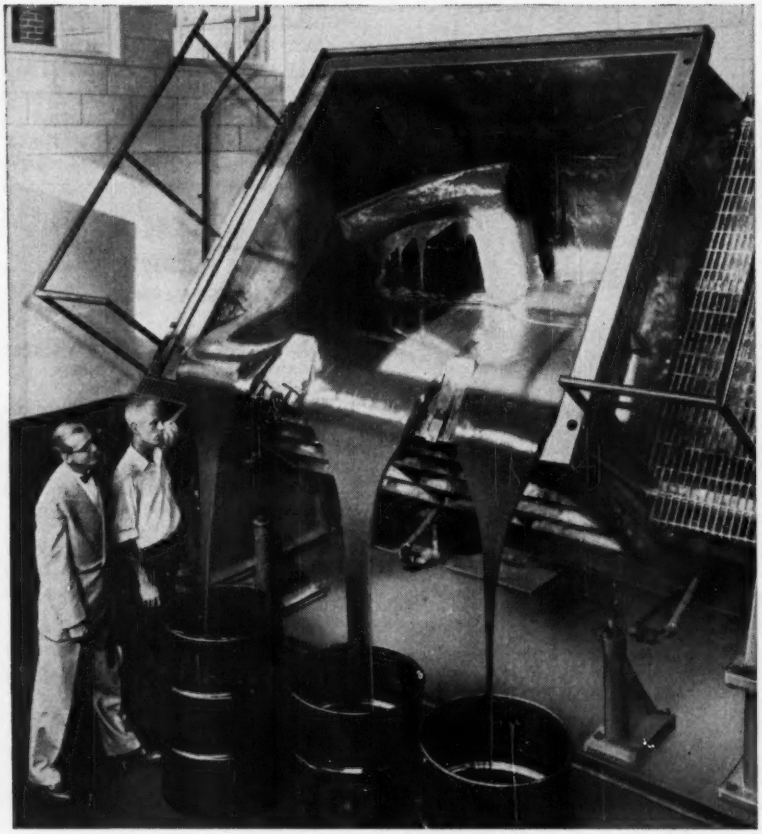
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Memphis, Tenn.—New Orleans, La.



BAKER PERKINS builds world's largest color blending machine

Now in operation at the Hilton-Davis Chemical Company's plant in Cincinnati, this huge blender and flushing machine, designed and built by Baker Perkins Inc., mixes 1000 gallons of flushed colors at one time. That's roughly 15,000 to 30,000 lbs., depending on the specific gravity of the colors, nearly three times the capacity of any other blender in use today. The unit weighs 21 tons and took two years to design, construct and install.

You may not need the world's largest color blending machine, but you can't go wrong if you rely on the company that can build one. When you need good, dependable chemical mixing machinery that will help increase your production and keep your maintenance and operating costs low, it will pay you to consult a BAKER PERKINS sales engineer or write us today.

248-A

BAKER PERKINS INC.

CHEMICAL MACHINERY DIVISION • SAGINAW, MICHIGAN

PRODUCTION . . . .

mats to its line. Multi-ply construction, says the firm, assures a uniform distribution of fiber. The new mats are aimed for use in filter presses or vacuum filter applications, are said to promote efficient formation of the cake and clarity of the filtrate.

• Owens-Corning Fiberglas (Toledo, O.) has standardized its line of Aerocor superfine wool products. Previously, the material had been cut and shaped for various applications in different fields. It will now be sold in standard sizes, thicknesses and densities for specific applications.

•

Automatic Atoms: A "packaged" automatic control system for electronical monitoring of atomic piles and related processes is the claim of the Industrial Div. of Minneapolis-Honeywell Regulator Co. Said to be the first such system, it will automatically regulate the rate of power generation at predetermined levels by regulating the reactor's control rods.

PROCESSES . . . .

For Low-Grade Uranium: Before the Chemical Engineering Division's meeting at the 36th annual conference of the Chemical Institute of Canada in Windsor (Ont.) last week, a quintet of researchers from the Univ. of Saskatchewan revealed progress they've made on processes for concentrating low-grade Saskatchewan uranium ores. They suggest that it may be possible to concentrate the ores by flotation. Although the resulting concentrate would still be low in uranium content, they point out that even a small increase in concentration would result in worthwhile savings if leaching were to be used in the recovery process.

•

For Low-Grade Beryl: A pilot plant for recovering beryl from South Dakota's Black hills pegmatite deposits started operating last week. Operated by the U.S. Bureau of Mines' Pegmatite Research Laboratory in Rapid City, the plant will employ a process developed by the bureau's S. M. Runke. In the laboratory, it indicated that it's possible to recover 80% of the beryl contained in an ore concentrate as low as 0.1%. Current production, says the bureau, results from hand-sorting coarsely crystalline sections of only the richest beryl-containing pegmatite. Average recovery is said to be about 20%. Essentially, the new method is a flotation process and will be used to start research on the separation of mica, feldspar, tantalite, columbite and other minerals found in pegmatite. The pilot plant is capable of treating 100 lbs./hour of ore.



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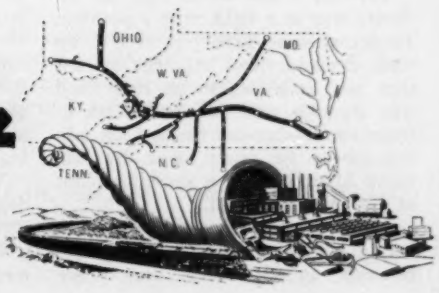
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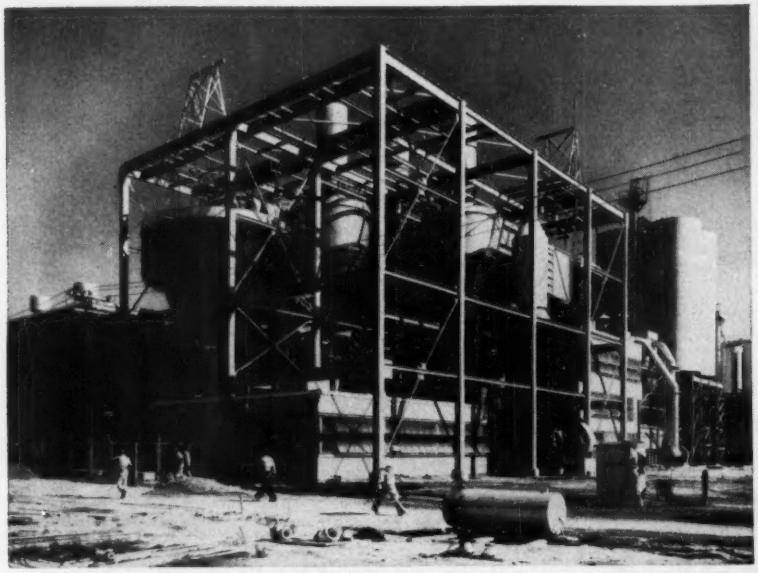
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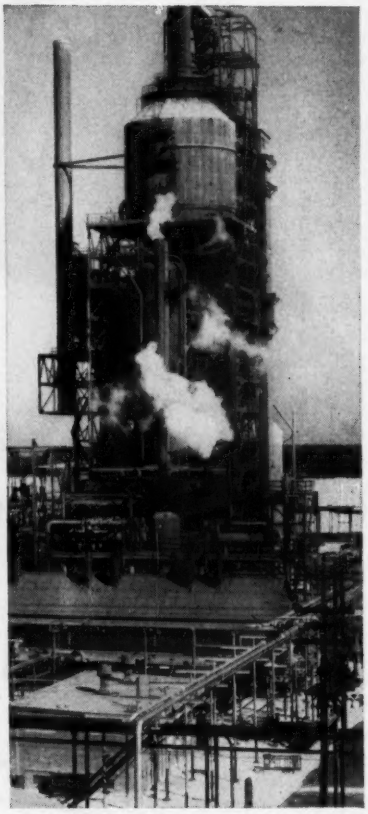
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PROBLEM: New Davison catalyst plant (above) helps industry to keep pace with burgeoning cat-cracking capacity (right), but creates closely competitive market.

Riding the Trade Winds

Petroleum catalyst salesmanagers are riding a strong tail wind. Oil refinery expansions have yet to reach the peak of their growth curve. And cat-cracking's share of the total refining capacity is on the up-sweep, too. But as any pilot knows, a tail wind can be tricky as well as helpful; unexpected gusts can be upsetting.

This week the catalyst industry's pilots are trimming their controls to adjust for a now-familiar side wind: temporary overproduction. Davison Chemical's new Lake Charles, La., plant (*CW, May 9*) has thrown 45 million lbs. into an estimated annual synthetic fluid catalyst market of 200-250 million lbs. And from Chicago come reports that Morton Salt's Bay Chemical Div. is now promising that its new Weeks, La., plant will be in production "momentarily."

Yet only a few weeks ago, the industry was in a tight supply position. Producers were hard put to stay up with demand. And expectations are that new refineries to be completed this summer and fall will tend to bring supply-demand forces back into balance—to be upset again by National Aluminate's now abuilding plant at Los Angeles, Calif.

All of these quick changes in marketing conditions are taking place, however, in an over-all atmosphere of dynamic growth. From a slow start in 1936 with the erection of Socony-Vacuum's first commercial cracking unit at Paulsboro, N.J., the catalyst makers expanded during the war till, in 1946, they were servicing a cracking capacity of 750,000 bbls./day. In the next six years, this figure shot up to 1952's 1.9 million bbls./day, and present oil industry expansion plans indicate that cat-cracking capacity will continue to grow at a 10%/year clip (compared to 5%/year for over-all refining).

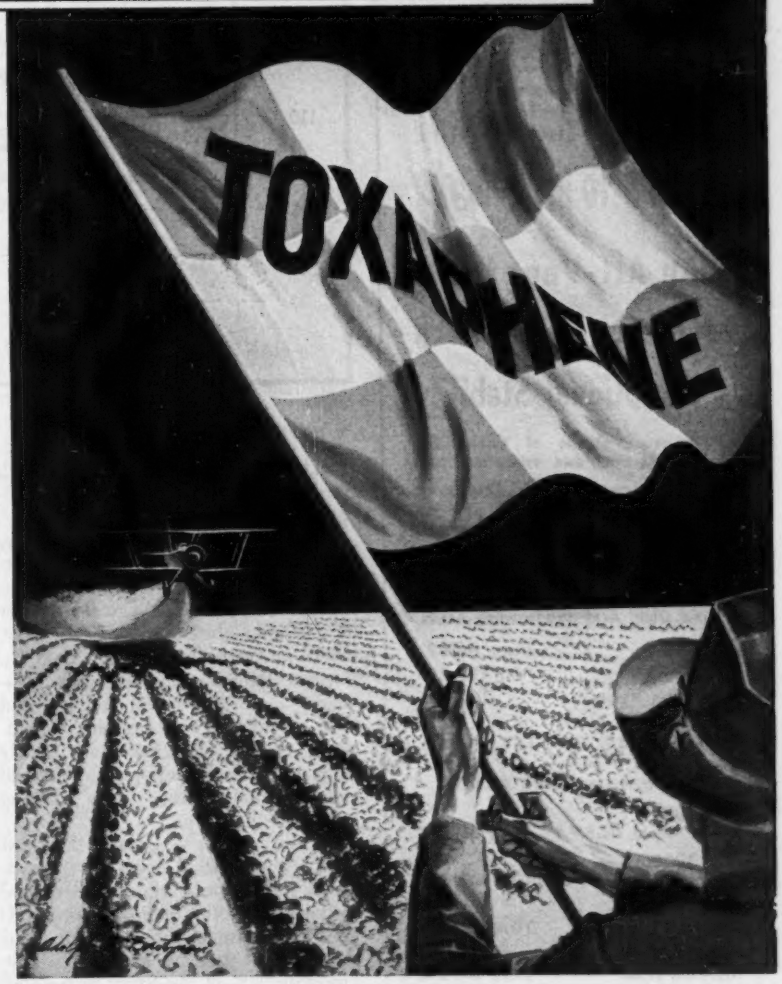
Maintaining an even distribution keel during this growth period has not been simple. New catalyst plants require a heavy investment ($5-9 million), and they must be built before, not after, the market requirement develops. Catalyst salesmanagers are proud of the fact that no refinery has ever shut down for lack of catalyst, but this policy has meant that in spite of their steadily expanding market super-competitive selling has been the rule. And in the technological jungle of modern refining, it's often difficult to hone an effective competitive selling edge.

Variety: As a result, catalyst selling depends to a great extent on technical service. The typical catalyst sales team is light on salesmen (as few as three men for an annual volume of $20 million), and heavy on home-base sales-service researchers. The catalyst makers must stay well ahead of their customers on all technical developments; indeed, they've led the way on many recent refinery operation improvements.

This situation arises from the part played by the catalyst in the cracking process. As a catalyst, it isn't chemically consumed in the operation; therefore its price is not of primary importance. Instead, the choice of catalyst depends almost entirely on "performance." Yet this performance is dependent, in turn, on a great number of operational variables. In order to make a sale—and get a repeat order—the catalyst salesman must be prepared to instruct his potential customer on exactly how to use it. And this "how" can vary from refinery to refinery, and from one method of operation to another.

This varying "how" also results in a confusing variety of catalysts on the market. Essentially they can be divided into two main groups: fluid-type and pellets. The pellets (or beads) are used to supply plants based on the Socony-Vacuum and

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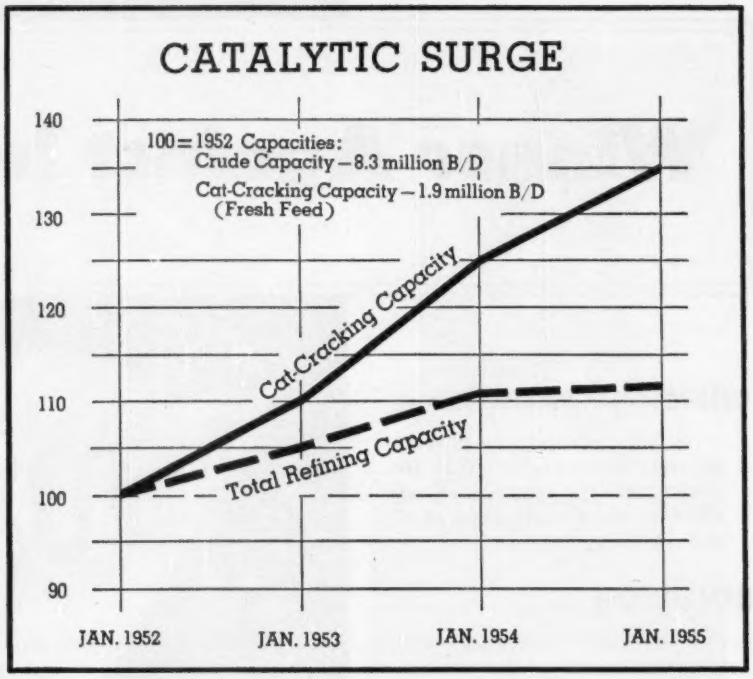
Century 1030 White Oleic (U.S.P.)	Titre 3- 5°C
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Houdry processes. These contrast with the fine powders produced for fluid-catalyst units.

A second division can be made according to raw-material sources: "natural" or synthetic. The Filtrol Corporation stands alone as a manufacturer of natural catalysts. Starting with clay, Filtrol makes both the pellet type (to compete with Socony-Vacuum's Sovabeads) and the more widely used fluid powders. The "synthetic" catalysts, on the other hand, are mostly silica-alumina compounds derived from sodium silicate as a starting material.

Of the several variations, the most competitive market exists on the synthetic fluid type. Refineries designed for beads or pellets can only use products made especially for them. And those plants that are technically able (roughly 25% of the total) to employ the cheaper natural catalysts, will usually do so. But refineries using synthetic fluid types can buy from any one of three chemical manufacturers: American Cyanamid, Davison Chemical, National Aluminate. When Bay Chemical's plant starts, it will provide a fourth source.

Industry guesses agree that Davison now holds about half of this synthetic-fluid market. Its new Louisiana plant, added to the capacity of its Baltimore and Cincinnati units, puts its total capacity ahead of former-leader American Cyanamid, with plants at Ft. Worth, Tex., and Michigan City, Ind. Third-place Nalco has its operation at Chicago.

Fine Grind: These three synthetic fluid-catalyst makers compete on very even terms. Their prices are all 16½¢/lb. And they have all been converting or building microsphere plants (with spray driers) to supplant their older ground-catalyst facilities. The resulting "M-S" grades are made up of minute silica-alumina balls that most oil men consider to be preferable.

The flow of these powders in the refineries can reach gigantic proportions. Some of the larger units have a circulation rate of 50 tons/minute. In fact, cat-cracking is a catalyst process in which the catalyst—in terms of pounds—overshadows the reactants. It takes 10 pounds of catalyst mixed with one pound of feed stock to convert the latter into the desired components. The catalyst is, of course, recovered and reused immediately.

The amount of catalyst per refinery unit varies widely, however, among the 90-odd cat-cracking units now operating. Some require an initial charge of only 25 tons. Others need as much as 1,200 tons. And replacement catalyst must be supplied at the rate of from ½ to 2%/day.

Losses out the stack necessitates some of the replacement. But this is insignificant. Mainly, the new catalyst is used to replace old material that is purposely removed and discarded. Re-

Advance Bulletin

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FILE NUMBER

DAXAD #11

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DAXAD #11

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finers have discovered that this technique is the best way to maintain the activity and selectivity of their catalyst charges. It's well worth the expense, and it provides a strong, stable market requirement for the catalyst makers.

The "coming in" of new refineries does not upset the stability of this market either. Oil men have found that brand-new catalysts are too "hot" for a new refinery's breaking-in period. Consequently the initial charge is usually a blend of used and new materials; sometimes it is entirely made up of catalyst removed from an operating plant.

Large petroleum companies customarily save old catalyst for this purpose. But small or new companies often have trouble scouting up enough used material to get started. In this case, the catalyst companies help out by contacting their other customers. It's just one more service that's provided in a selling situation that puts a premium on imaginative customer services.

•

New Agents: Newly formed Evan-Strom Co. will distribute chemical additives in San Francisco. The firm will represent the Enjay Co., Foote Mineral Co., Ohio Apex, Inc., and the Vopcolene Div., Vegetable Oil Products Co.

• Gordon Chemical Co., Inc., Kansas City, Mo., has been appointed a distributor of flushed colors and dry color pigments for the Hilton-Davis Chemical Div., Sterling Drug, Inc.

•

School's Out: The Chemical Market Research Assn. has completed a course in chemical market research at Case Institute of Technology, Cleveland, O.

•

Products Added: Celanese Corp. of America is producing propylene glycol at its Bishop, Tex., plant.

• Quaker Chemical Products Corp. is now in commercial production of sodium dioctyl sulfosuccinate, a wetting, penetrating and dispersing agent.

•

For literature collectors and tourists, the Standard Oil Co. (Indiana) has prepared "A Trip Through Sugar Creek Refinery," a 24-page pocketbook summarizing the plant's operations. It's to be the first of a series covering each of the company's refineries.

• Monsanto Chemical Co. has issued a new technical bulletin describing "Santicizer 160," a primary plasticizer.

• Common applications for zinc dust is the subject of a new bulletin issued by Federated Metals Div., American Smelting and Refining Co.

• Bakelite Co. has published a new booklet titled "Halowax Chloronaphthalene Oils and Waxlike Solids." It presents a number of charts and tables in which chlorine content, electrical



Making It On the Site

TO SUPPLY saran monofilaments for the fish nets of Japan, this extrusion plant is being completed by Asahi-Dow Ltd. at Suzuka. The firm also makes saran powders.

Dow Chemical thus ducks behind the currency barriers by making the saran products where they are to be used. It shares ownership of Asahi-Dow—through its international subsidiary—with Osaka's Asahi Chemical Industry Co. Ltd.

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and physical properties of Halowax chloronaphthalenes are compared.

• The Calco Chemical Div., American Cyanamid Co., has issued a new technical bulletin, "Dispersion of Titanium Dioxide Using the Intensive Mixing Procedure."

• Textiles are the subject of two booklets available from The American Viscose Corp. One is called "Fiber Facts," the other is "Avisco Textile Chemicals," a technical data book.

• Hercules Powder Co. has released a technical booklet giving up-to-date information about the use of Vinsol, a dark-colored resin.

•

Acid Action: Celanese Corp. of America has begun large-scale production of both propionic and butyric acids. Output is coming from a new unit for special products at the Pampa, Tex., plant.

• Fumaric acid is now available in commercial quantities from Monsanto Chemical Co.

•

Branching Out: American Cyanamid's Lederle Laboratories Div. has opened a new branch in Portland, Ore., to assist sales and distribution efforts in the Northwest.

• Du Pont will consolidate its three Chicago sales offices in a $750,000 office building to be built in Lincolnwood, a Chicago suburb.

• J. T. Baker Chemical Co. has moved its Quaker City sales office from Philadelphia to larger quarters in nearby Upper Darby, Pa.

• Union Bag & Paper Corp. has opened a new Western sales office in Kansas City, Mo.

• General Electric Co.'s Silicone Products Dept. has established a new warehouse in Chicago, Ill.

• The Anderson Laboratories (Weston, Mich.) have started producing *m*-diethylaminophenol, a pharmaceutical intermediate.

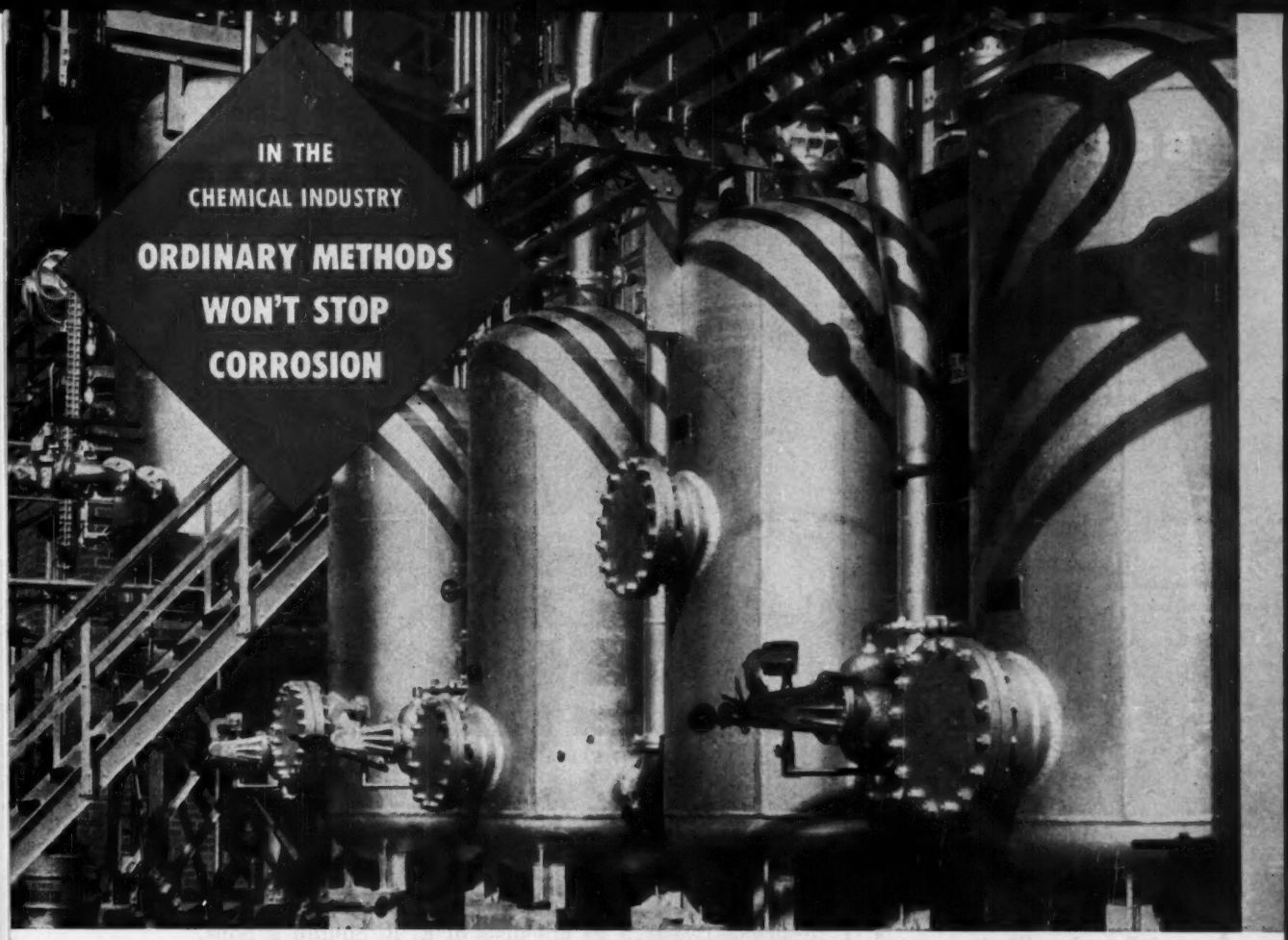
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Transaction: Continental Can Co. has purchased the flexible packaging business of Shellmar Products Corp. (Mt. Vernon, O.). The deal won't be final until Shellmar's stockholders approve it late this month.

Shellmar's Flexible Div. is a converter of cellophane, polyethylene, etc., with four plants in this country and five operating subsidiaries in Latin America.

•

Addition: Diamond Alkali Co. has completed its second unit in a program to build storage and handling facilities for centralized customer services. The first was at Cincinnati, the second at Jersey City.



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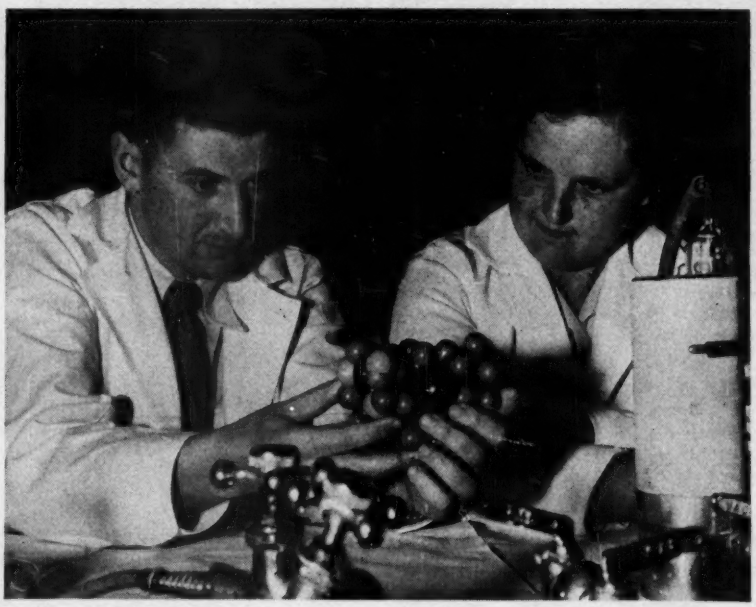
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SQUIBB'S FRIED AND SABO: Down a side road, an eyebrow-raising discovery.

Unexpected Dividend

A new synthesis of hydrocortisone and five active, halogenated cortisone and hydrocortisone derivatives are the results of research by chemists of E. R. Squibb & Sons.

Two of the new derivatives are precedent-shattering in their field, exceed cortisone in biological activity.

There's no guarantee, however, that they will make effective drugs; clinical studies are now in progress.

Blazing a short-cut on the difficult synthetic route to cortisone, a team of Squibb chemists has stumbled upon a well concealed side road leading to a new class of potentially valuable halogenated hormone substances. That, in itself, is important news. But what makes it more exciting to the experts is that two of the new materials—derivatives of cortisone and hydrocortisone—possess even greater activity than the natural hormones.

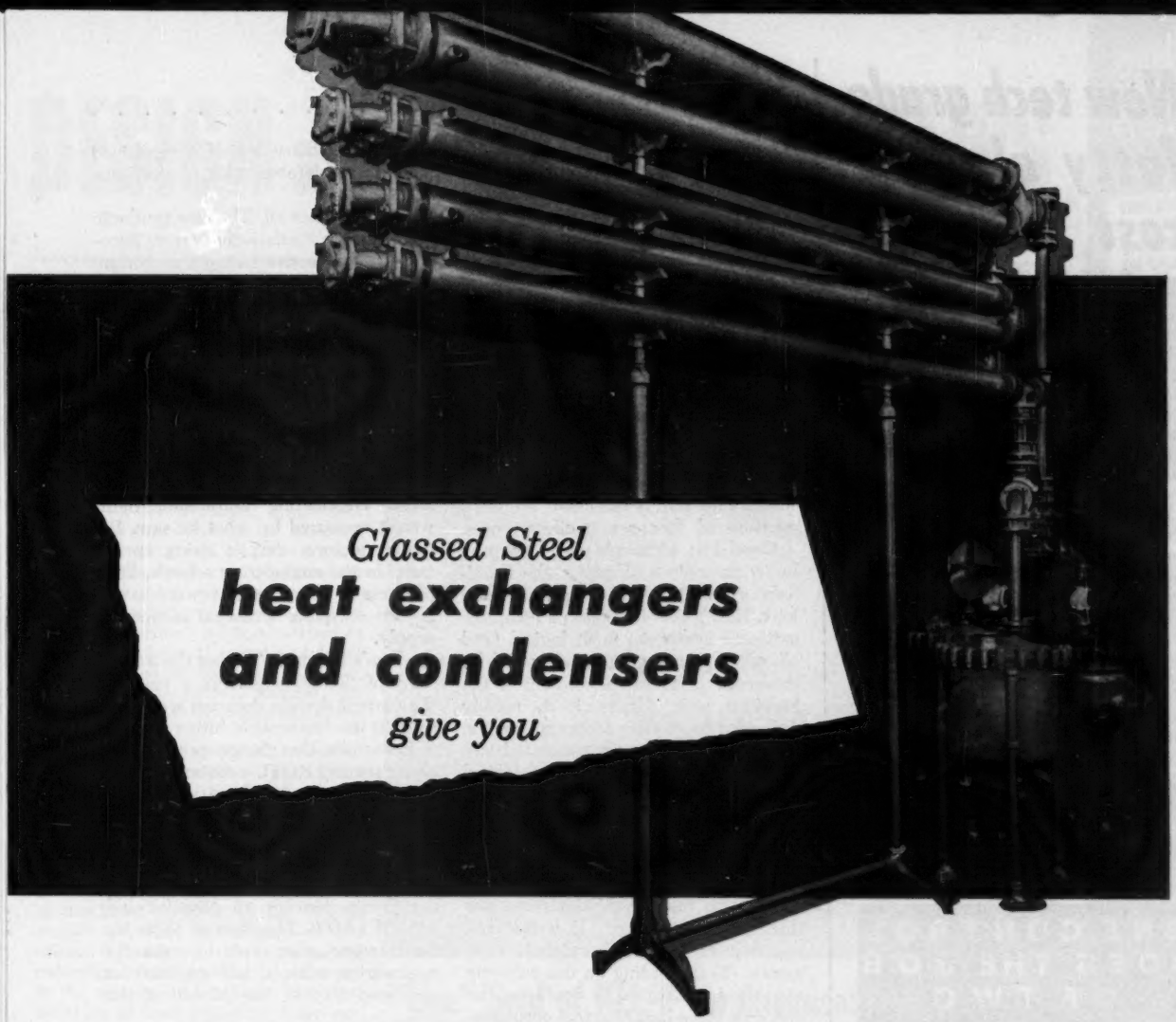
There's no law that says this kind of discovery is impossible. Yet, on the strength of precedent, it's highly improbable. The chemical structures of the majority of known vitamins and hormones are highly specific with regard to their biological activities. Only in a few instances has it been possible to synthesize compounds that compare in activity with the naturally occurring substances. When synthetic derivatives are found having greater activity than their natural counterparts, there's bound to be a good deal of justifiable surprise.

Laurels for Two: Credit for the eyebrow-raising discovery belongs to Squibb steroid researchers Josef Fried and Emily Sabo.

Fried—head of steroid research at Squibb Institute's* division of organic chemistry and assisted by Mrs. Sabo—was working out a new method to convert epihydrocortisone to hydrocortisone (Compound F). Their work is the outgrowth of a broad program, started several years ago, devoted to the alteration of steroids by mirco-organisms and by ordinary synthetic techniques. It gained powerful impetus from the development of microbiological methods for oxidizing steroids.

By the microbiological oxidation of Reichstein's Compound S, Compound epi-F was last year, for the first time, made available in practicable amounts. Fried's idea: to try to develop a method of converting the biologically inert Compound epi-F (11-epihydrocor-

* Squibb Institute for Medical Research, New Brunswick, N.J.



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tisone) to the therapeutic Compound F hydrocortisone) and thereby eliminate several yield-cutting steps of previous F syntheses. Success was his, and five halogenated intermediates in the new procedure proved to be an unexpected dividend.

Their identities and activities (by the rat liver glycogen assay; cortisone =1): 9α-chloro-17α-hydrocorticosterone acetate, 4.0; 9α-chlorocortisone acetate, 3.5; 9α-bromo-17α-hydroxycorticosterone acetate, 0.28; 9α-bromocortisone acetate, 0.55; and 9α-iodo-17α-hydroxycorticosterone acetate, 0.1. Of course, these activities are the result of a laboratory bio-assay, are not a measure of therapeutic effectiveness.

Good Fit: Although partly eclipsed by its precocious offspring, the Fried-Sabo synthesis is well worth a second look. Here's how it fits into a complete cortisone synthesis: most logical (and abundant) starting material would be diosgenin, a steroid constituent of the Mexican yam. Diosgenin is readily degraded to 16-dehydropregnenolone, which, in turn, is easily converted into Compound S acetate. Microbiological oxidation takes Compound S through to 11-epihydrocortisone (epi-F), which would then be transformed (in from five to seven steps) by the Fried-Sabo technique to hydrocortisone acetate.

All told, the Fried-Sabo work has threefold significance: (1) it opens a new field of research in synthetic hormones; (2) depending on the outcome of clinical evaluation, it could be the donor of some highly active cortisone-type drugs; (3) it provides an attractive intermediary leg of a combined chemical-microbiological cortisone synthesis.

But that's not all. The new synthetic route makes it relatively easy to introduce a radioactive halogen or tritium isotope into the stable 9-position of the cortisone molecule, provides a valuable tracer tool for fundamental biochemical investigations.

Dim Forecast

Last week Carnegie Tech's Dean* John W. Graham cast a concerned eye over the U.S. Office of Education's latest engineering enrollment data, wasn't reassured by what he saw. It's a dim picture: despite rising enrollment in the engineering schools, little progress is being made toward assuring an adequate technical manpower supply.

Graham's forecast: "Filling the annual need of 30,000 engineers a year for the current decade does not seem possible in the foreseeable future."

Reason for this gloomy prediction is clear: soaring ROTC enlistments. This year, for example, there will be an estimated 24,000 graduates from the nation's engineering schools. Of this number, approximately 6,800 are signed up with Reserve Officers Training Corps, leaving an effective balance of 17,200. The class of 1956, the third largest class ever to enter the engineering schools, will graduate an estimated 29,000. But 12,400 of this

* Assistant Dean of the College of Engineering and Science.

A Tall Order

STANLEY L. MILLER, 23-year-old graduate student in chemistry at the Univ. of Chicago, tends his apparatus for duplicating the earth's atmosphere of three billion years ago. His aim: to gain insight into the mechanism by which life could have been formed from simple substances. Miller, working for a Ph.D. with Nobel Prize-winner Harold Urey, placed methane, ammonia, water and hydrogen in the apparatus, boiled them and subjected them to 20,000 volts of electricity for one week. Produced from the mixture: amino acids. It's speculated that amino acids in primordial seas combined in some way to form the basis of living substances. Miller's work could also have basic import as a synthetic amino approach.



DESIGN and PRODUCTION NEWS

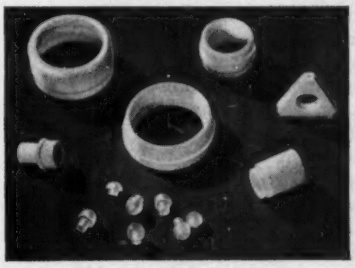
FOR CHEMICAL ENGINEERS

Published by TECHNICAL SERVICE, Chemical Manufacturing Division, The M. W. KELLOGG Company JUNE 1953

Corrosion, Moisture Interference Eliminated in Immersion Gauge

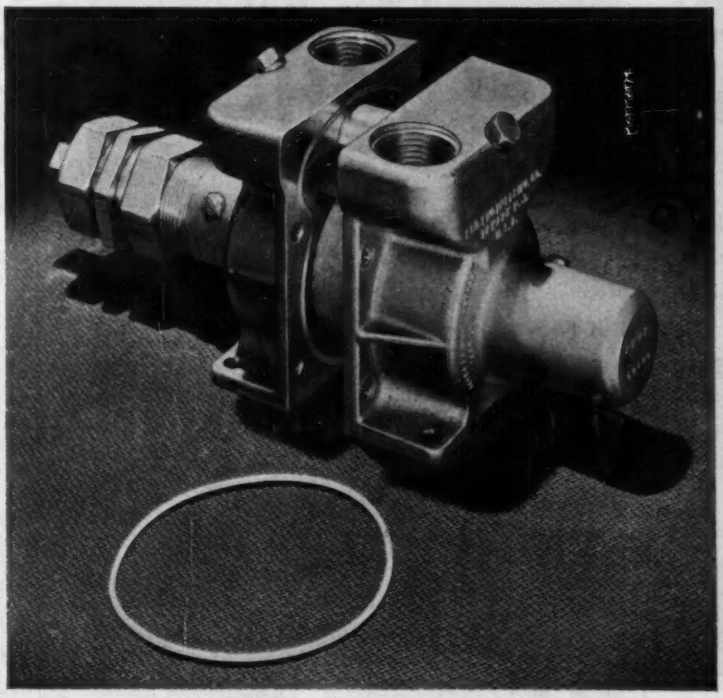
The difference between dependable "laboratory" accuracy or complete breakdown for a rugged immersion-type electronic fuel gauge may be attributed in part to its 59 machined Kel-F polymer parts, samples of which are shown here. Used primarily as dielectric insulators to isolate each of the three "probe" tubes which act as capacitor surfaces, the plastic parts are also subjected to constant vibration, corrosion from aircraft sludges and fuels, wear, and random concentrations of moisture.

The three-tube probe of the instrument which senses the weight of fuel in an aircraft tank may be completely or partially immersed at all times in volatile aircraft or jet fuel at temperatures ranging from minus 60° to 200°F. The unusual chemical inertness of the Kel-F—resisting corrosion or erosion of machined surfaces by the fuel or sludge—prevents any change in the critical spacing of .1" between the capacitor tubes essential to accuracy in the instrument readings. Electrical isolation of each capacitor tube surface is complete due to the excellent dielectric strength of Kel-F plastic. Dependable insulation, free from surface shorting or grounding caused by moisture or residues found in the fuel, is assured by the zero water absorption and non-stick characteristics of Kel-F.



The precision insulating parts required for this electronic instrument are produced by the Tri Point Manufacturing Company of Brooklyn, N.Y. Tri Point uses rod and tubing extruded from Kel-F polymer and then machines the necessary parts on standard automatic screw machines. The ready machinability of Kel-F permits this company to maintain tolerances within .001" on all parts supplied to the Aviation Engineering Corporation of Woodside, N.Y., manufacturers of this aircraft instrument.

Refer to Report E-108



"Live" Seal of KEL-F® in Chemical Pump Permits Safe, Air-Free Liquid Transfer at Constant Rates

Designed to handle nitric acid, hydrogen peroxide and other hazardous and non-hazardous chemicals at from ½ to 10 gpm, this stainless steel pump takes advantage of Kel-F polymer chemical inertness to insure safe operation. The polymer "O" ring seal, installed in a machined groove in mating pump halves, remains flexible at all operating temperatures, preventing escape of corrosives or entrainment of air.

The high compressive strength of Kel-F trifluorochloroethylene polymer and low "cold flow", which enable the ring to retain its form under pressure, maintain the pumping chamber at a constant volume thereby insuring constant pumping flow rates. The non-adhesive characteristic of Kel-F prevents the "O" ring from "setting" permanently in the seal groove, making dismantling of the pump for inspection a much easier task.

The "O" ring seal of Kel-F used in this positive displacement chemical pump is produced by the Young Development Laboratories of Rocky Hill, N.J. for the Eco Engineering Company of Newark, N. J. who manufactures the "All Chem" pump. Young Laboratories extrude Kel-F in rod form on a standard batch extruder, then fabricate sections of rod into "O" rings by a special heat sealing method developed for this purpose. When completed, the ring is smooth and without evidence of the heat-sealed joint.

Refer to Report C-107

For complete information regarding any item mentioned in DESIGN AND PRODUCTION NEWS, ask for detailed APPLICATION REPORTS, write

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Both the primary Stepan Makanols and their sulfates are available in commercial quantities based on semi-works unit production.

TENTATIVE SPECIFICATIONS

	% Myristyl Alcohol	% Cetyl Alcohol	% Stearyl Alcohol	% Oleyl Alcohol	% Linoleyl Alcohol	Iodine No.	Saponification Value	Titer
MAKANOL I	6	27	15	50	2	55	2	42
MAKANOL II	6	27	67	..	..	4	2	52

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group are in ROTC; the balance, 16,600, is even less than this year's.

"These statistics," Graham warns, "become all the more alarming when contrasted with similar figures for Russia. Russia is reported to be graduating 30,000 men a year in engineering with the equivalent of a master's degree, and 60,000 technicians to back them up."

Cause of the mushrooming ROTC is no mystery. It's due mainly to the mounting impact of the Korean war. The big question is, What can be done about it? Graham's answer: a more enlightened selective service policy. "Actually," he points out, "the net effect of the current deferment program is almost negligible because of the relatively small percentage of any age group that may be involved."

Although left unsaid, the implied recommendation is clear: a liberalized program of deferment for scientists and engineers. For avowed critics of special treatment for students, Graham has this word: "We cannot afford to make a gesture toward surface equality at the sacrifice of our national security . . . men in training in the colleges and universities are contributing just as much to national preparedness as are men in training in the armed services."

New Pyridine Potential

Once again, there's new meaning to the old chestnut: "There's more than one way to skin a cat." This time the "cat" is the classic reluctance of pyridine to undergo substitution in the 4-position; and the skinner is E. Ochiai of the Univ. of Tokyo. His tool: pyridine-1-oxide.

In a just-published compendium of more than a decade of research, chemist Ochiai unveils pyridine-1-oxide as an extremely useful derivative that is much more susceptible to 2- and 4-substitution than pyridine itself. It's comparatively easy to make in good yield (80%-90%) by peracetic acid oxidation, opens the door to new commercial opportunity.

Here are the keys to its future in organic synthesis:

• Unlike pyridine, it readily nitrates, gives 4-nitropyridine-1-oxide in good yield. And the activating influence of the N-oxide function carries over to such relatives as α-picoline-1-oxide and 2,6-lutidine-1-oxide, both of which form 4-nitro derivatives. A condensed structure like quinoline-1-oxide is even more easily nitrated (to the 4-nitro) than pyridine-1-oxide.

• Substituted nitro groups are easily reduced to aminos without altering the N-oxide configuration. They

New BROCHURE!

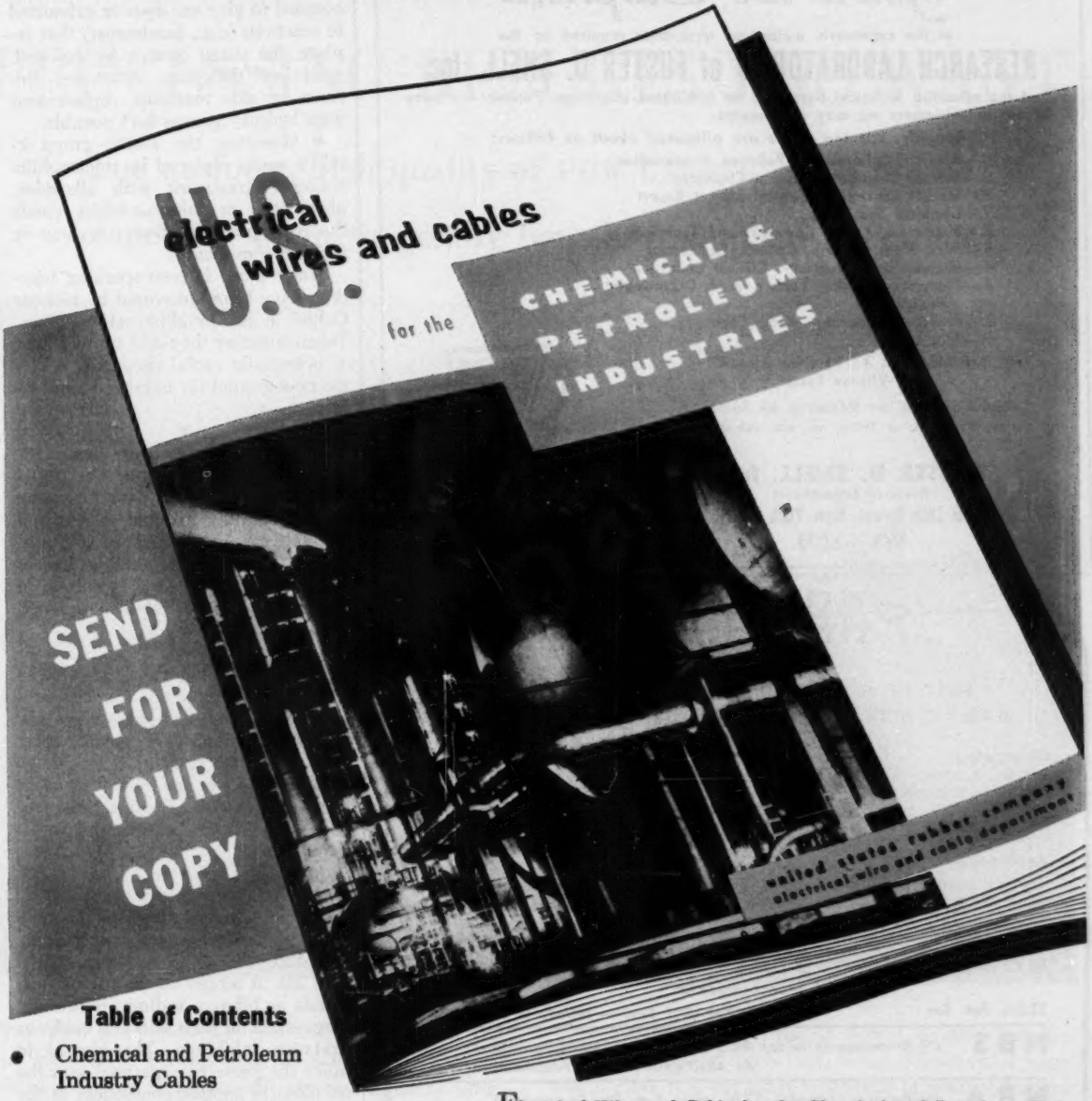


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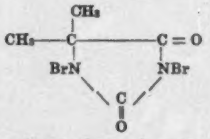
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RESEARCH . . . . . .

also show a marked tendency to undergo bimolecular reduction, form azo and hydrazo derivatives. The aminopyridine oxides may be diazotized, coupled to give azo dyes or submitted to reactions (e.g., Sandmeyer) that replace the diazo groups by halogen, cyano or thiocyano structures. Because of side reactions, replacement with hydroxy groups isn't possible.

• Moreover, the 4-nitro group itself is easily replaced by nucleophilic reagents; treatment with alkoxides, phenoxides or thiophenoxides yields the corresponding alkoxy, aryloxy or arylthio compounds.

Many more interest-sparking reactions have been uncovered by pioneer Ochiai in his pyridine oxide probes. Taken together they add up to a host of potentially useful chemicals, a fertile new ground for industrial exploration.

•

Trio: Three new reagents are available from Fisher Scientific Co. (Pittsburgh, Pa.): primary n-amyl alcohol, a highly purified alkaloid solvent and qualitative reagent; low-nitrogen Devarda's metal for generating hydrogen; and low-nitrogen selenium, a rapid catalyst for Kjeldahl determinations.

•

Follow-Up: Just off the presses is the first supplement to the current catalog of Eastman Organic Chemicals. It lists 40 additional compounds, their costs and vital statistics.

Copies are free for the asking from Eastman Organic Chemicals Dept., Distillation Products Industries Rochester, N.Y.).

•

Oil Aid: A new discovery unveiled by Canada's National Research Council could be one solution to the problem of getting more life out of auto engine oils. It hinges on the use of such metals as lithium, sodium, potassium, magnesium, or their salts and oxides as oxidation inhibitors. The idea is to build the protective material into the oil filter, or another component of the lubricating system.

Brainchild of two NRC scientists, the process is reported to boost lube oil life sevenfold. NRC is trying to obtain patents in Canada.

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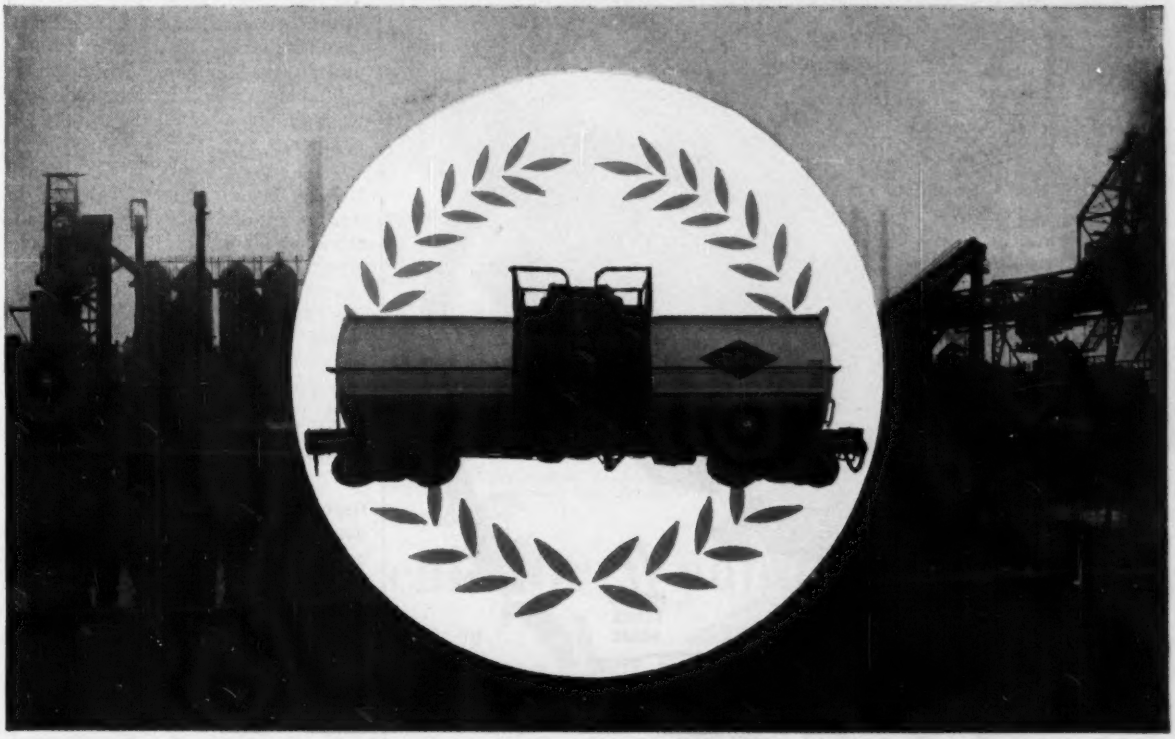
Change of Scene: National Science Foundation has packed up and moved to a new location in the capital. Address: 1520 H St., N.W. Mailing address remains the same—NSF, Washington 25, D.C.

Also from NSF, comes word of a $12,750 grant to the Univ. of Colorado for an upcoming (June 15 to Aug. 7) conference in collegiate mathematics.

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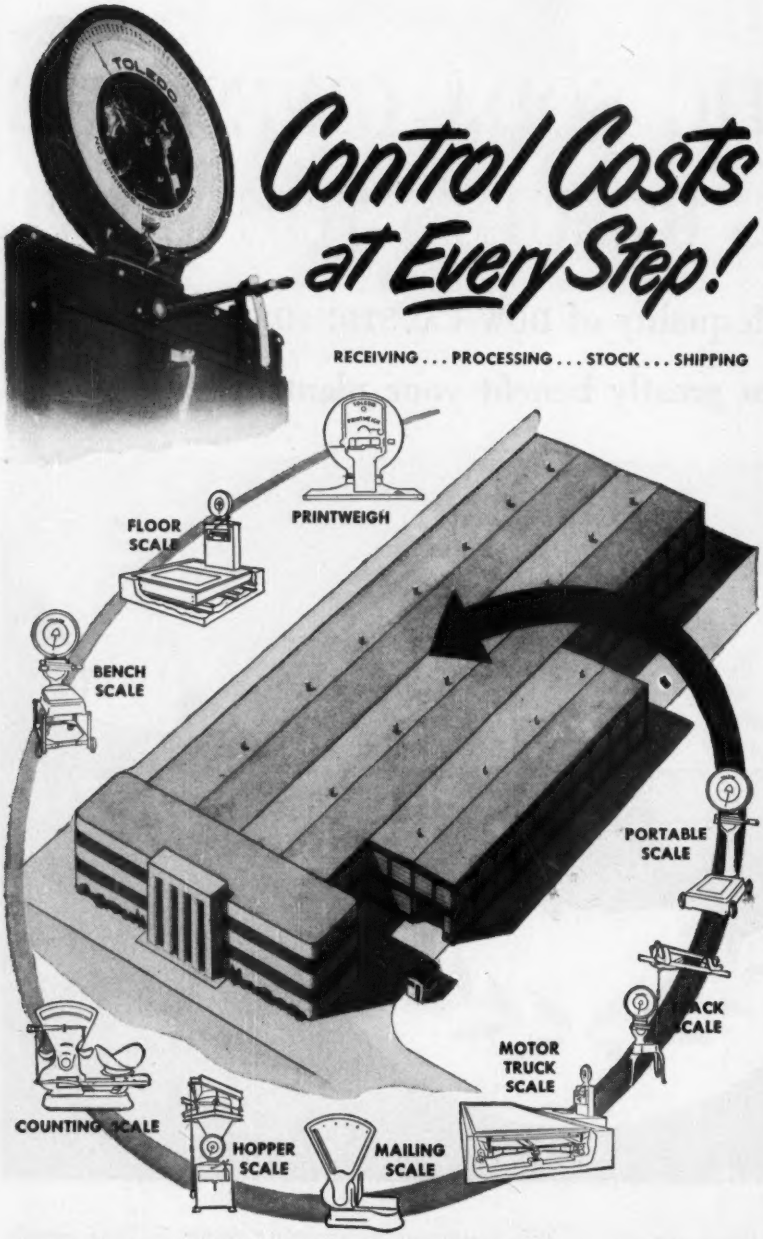
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It's part of an effort to upgrade research talent at the grass roots level. Says the foundation: "About 45 teachers of mathematics from small colleges throughout the United States will attend. The purpose of the conference is to assist teachers in colleges not closely associated with large research centers to improve the quality of training of undergraduate majors in mathematics."

•

Eureka: There's good news in the geological quest for niobium element number 41. The U.S. Geological Survey reports that rich deposits of the strategic metal have been found in central Arkansas, and a detailed geochemical survey of the area is now under way. Niobium, also known as columbium, is vital for the production of high-temperature alloys used in jet aircraft.

•

Helping Hand: A new fellowship, in the amount of $2,500, has been established at Georgia Institute of Technology by Rayonier Inc. (New York). Object: to further the study of cellulose and the silvichemicals (wood chemicals other than cellulose). Notes Rayonier Executive Vice-President James Sheehy: The field of silvichemicals, in particular, needs additional study. "It may properly be regarded as almost virgin territory."

•

Hormone Progress: Results of Laurentian Hormone Conference's international symposium on methods of measuring steroid hormones will shortly be available under the title "Recent Progress of Hormone Research." Fifty-eight researchers representing four foreign countries, 13 states and the District of Columbia participated in the meeting held recently at Worcester Foundation for Experimental Biology (Shrewsbury, Mass.).

•

Right Combination: A promising new group of anti-TB compounds has been synthesized by chemists of E. R. Squibb & Sons. They're thiocarbanilides, combine high anti-TB activity with low toxicity. Resistant strains of organisms did not develop during the Squibb test period.

•

In the Works: A new $630,000 laboratory building will go up on the cleared site of Hooker Electrochemical Co.'s 37-year-old research laboratories at Niagara Falls, N.Y. Slated for occupancy by fall, the new structure will house 12 laboratories plus auxiliary facilities.

• Building plans of a more exten-

Dependable Source of Chemical Raw Materials



Albert Ruth, President, New Bedford Rayon Company (right), discusses plans with Peter A. Green, Vice President (center), and Wyandotte Representative John H. Bahlburg.

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sive nature were revealed by State Univ. of New York's College of Forestry (Syracuse), which will construct a $3-million, four-story wood products laboratory building, beginning this year. It's for a triple-pronged program of research and instruction in wood technology, forest chemistry and forest utilization.

•

Urea Shuffle: A novel synthetic route to an up-and-coming class of compounds is the news from Monsanto Chemical Co. laboratories. Monsanto researchers report 57%-71% yields of isocyanates from the vapor-phase reaction of sym-disubstituted ureas with hydrogen chloride.

•

Heading West: North American Philips Co.'s (Mount Vernon, N.Y.) X-ray diffraction school, traditionally held in the New York area, will shortly have a counterpart in the West. First of the new sessions will take place the week of Aug. 24 at San Francisco's Francis Drake hotel. Philips is now registering prospective students; there's no fee for the course.

•

Commissioned: Dow Chemical Co. has removed the wraps from its brand-new Edgar C. Britton Research laboratory. Named in honor of Dow's renowned organic research chief, the new laboratory building provides working space for a technical staff of 60.

•

Antioxidant Primer: From Germany comes word of a recent study aimed at clarifying the connection between chemical structure and function of aromatic fat antioxidants. Researchers Taufel and Rothe of Potsdam find:

- Hydroxy compounds are more active than amino, nitro or quinone compounds. Esters and ethers are less active than free hydroxy groups.
- Polyphenols are more active than phenol; and the ability to form quinones and condensed rings favors antioxidant activity.
- Solubility of the compound in lipoids and its capacity for reduction have no influence on its antioxidant properties.
- Activity of quinones, amino and nitro chemicals may be boosted by the introduction of functional groups.

•

Job Seekers: Commercial Solvents Corp. is now offering an industrial grade of the choline salt, 2-hydroxyethyltrimethylammonium bicarbonate. Supplied as a 45% aqueous solution, the compound is for manufacturing purposes only. Suggested uses: in pharmaceutical manufacture; as a

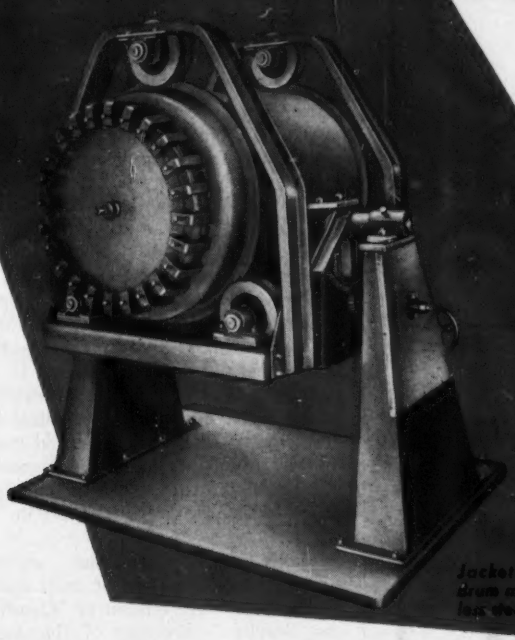
BACK IN THE 1880's

WHEN GERONIMO WAS ON THE WARPATH

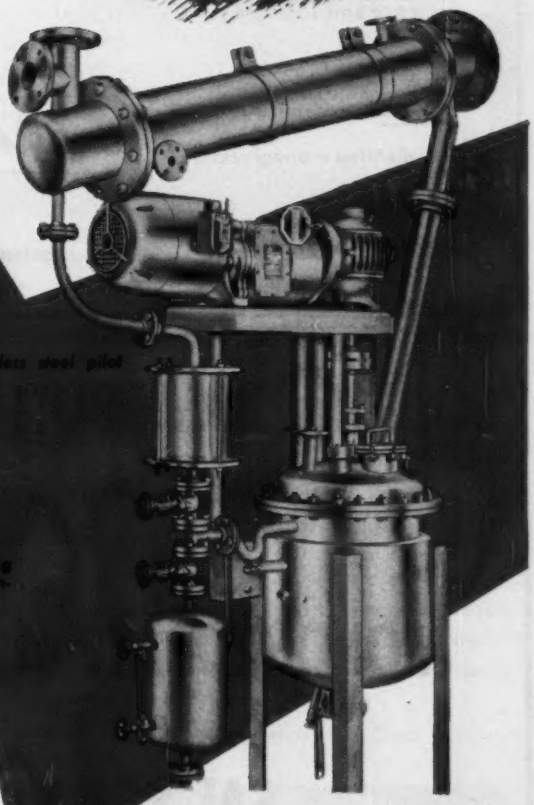


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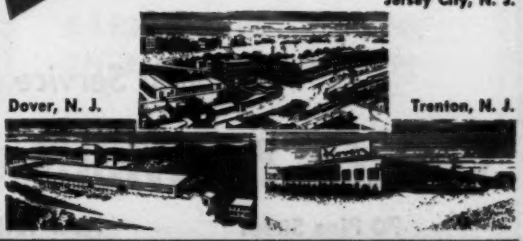
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RESEARCH . . . . . .

latent catalyst for resins; and in processes that could benefit from the release of a strong base by the application of heat.

• Three new carbon-14-labeled compounds are newly available from Tracerlab Inc. They're lauric, stearic and DL-aspartic acids. The fatty acid tracers have a place in flotation studies, soap and oil research.

•

Liberated: Twenty patents held by Atomic Energy Commission have just been released for nonexclusive, royalty-free licensing. Included: "preparation of zirconium tetrafluoride" (2,635,037); and "rare earth separation by anion exchange" (2,636,044). Commission-held patents and patent applications released for licensing now total 565.

•

Purity for Sale: Chromatographically pure S-acetyl glutathione is newly available from Schwarz Laboratories, Inc. (New York). Applications include biochemical investigations of detoxification, diabetes, radiation exposure, wound healing.

•

Going Commercial: Vanillic acid is well on the way to commercial output at American Bio-Synthetics Corp. (Milwaukee). Now in pilot-production, the white powder is available in 1- to 500-lb. lots. Current uses: fungicide and drug. Potential use: chemical intermediate. Cost, however, could stand in the way of large-scale development of the material's promise as an intermediate; it now goes for $9.25/lb.

•

Seeker's Aid: Consultant seekers should find the object of their quest in the new, 14th edition of "Consulting Services"—directory of the Assn. of Consulting Chemists and Chemical Engineers, Inc. To make things as easy as possible, the directory is split into four sections: classification of fields of activity; member consultant's specialties; where to find unusual laboratory equipment; and a listing of members' addresses.

•

Emphasis on Extraction: A new firm with the avowed aim of developing and distributing flavinoid compounds, Karl B. Rosen & Co., Inc., has been established in New York, N.Y., will deal—for the present—only in extractives. Reason: interest in flavinoids is reputedly changing from general therapeutic application to specialized uses as nutritive supplements. With an eye to the future, the firm has set up a program for research into new geriatric and nutritional uses of flavinoids and related materials.

Take a new look at

Niacet Brand vinyl acetate monomer

Promising new uses and greatly expanded production capacity will make it worth your while. One of the new uses that is creating considerable interest is the manufacture of emulsion paints. The flexibility and resistance to yellowing of vinyl acetate polymers make them outstanding for this application. Two others that are already profitable and commercially important are the preparation of synthetic textile fibers and soil conditioners. And now with the increased availability you can put this reactive monomer to immediate use in established applications such as the manufacture of safety glass, adhesives, surface coatings, and vinyl sheetings, tubing or molded products.

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Vinyl Acetate gives polymers that are flexible, transparent, and show good resistance to abrasion and stability to light. They also have outstanding bonding strength for wood, glass, paper, metal, and textile fibers.

COPOLYMERIZATION

Vinyl Acetate copolymerizes with other ethylenic monomers such as maleic anhydride, maleic esters, acrylonitrile, higher vinyl esters, vinyl halides, and acrylic and methacrylic esters.

SPECIFICATIONS

	Vinyl Acetate DPA and Vinyl Acetate HQ
Specific Gravity at 20°C.	0.9335—0.9345
Boiling Range at 760 mm. Hg.	71.8—73.0°C.
Vinyl Acetate, Minimum	99.50%
Acetaldehyde, Maximum	0.04%
Free Acid (as acetic), Maximum	0.02%
Moisture, Maximum	0.15%
Color (inhibited)	Colorless to Light Yellow
Flash Point (open cup)	20°F.

AVAILABILITY:

Drums (410 lb. net) and Tank Cars (8000 gal., 62,500 lb. net)

NIACET Brand Vinyl Acetate monomer is available in two grades—NIACET Vinyl Acetate DPA, inhibited with diphenyl amine and NIACET Vinyl Acetate HQ, inhibited with hydroquinone. The DPA grade can be stored safely for up to two years but the inhibitor must be removed before polymerization. The HQ grade should be polymerized within 60 days. The inhibitor does not need to be removed.

For prices on this versatile monomer call or write our nearest office.

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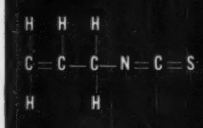
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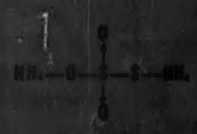
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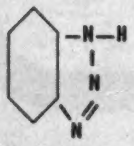
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Crystals and 60% Solution. The ammonium equivalent of Hypo — more soluble and more reactive; working ingredient in rapid photographic fixers; brightener in heavy silver plating baths; proposed for wood treatment, manufacture of cellulose esters.



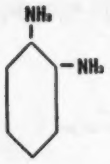
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Photographic and Technical. Photographic restrainer for high contrast work; corrosion inhibitor; should be valuable as an antitoxidant and intermediate.



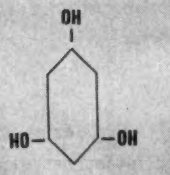
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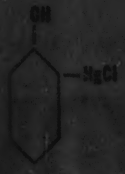
o-phenylenediamine —

Photographic and Technical. A photographic developer and pharmaceutical intermediate; proposed as intermediate for dyestuff and other syntheses.



phloroglucinol —

C. P., Technical & Commercial. Developer for diazotype reproduction papers and acetate black dyes; laboratory reagent; proposed as pharmaceutical and dyestuff intermediate, resin additive; antitoxidant. Related symmetrical tri-amines also available.



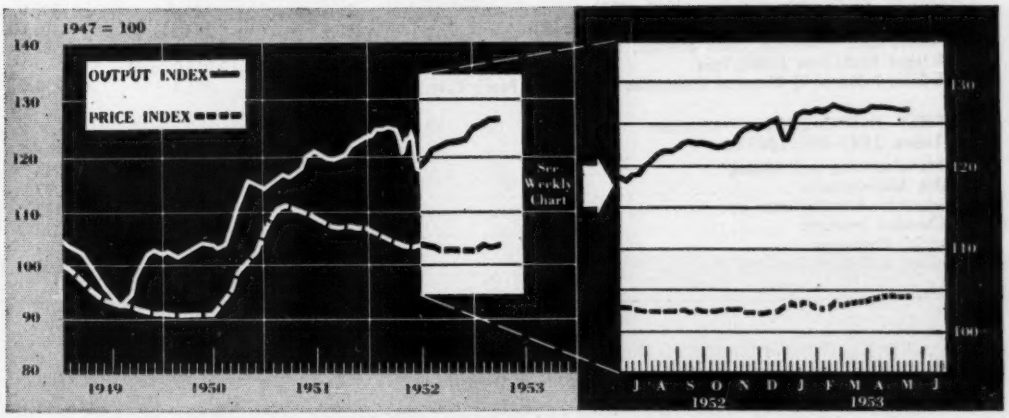
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CW Index of Chemical Output—Basis: Total Man Hours Worked in Selected Chemical Industries
CW Price Index—Basis: Weekly Prices of Sixteen Selected Chemicals

MARKET LETTER

Chlorine will cost more come July 1. That big producer's announcement last week confirms the report here (CW Market Letter, Mar. 28), that third-quarter liquid chlorine prices would be higher.

Despite the hint here, however, not a few users—and some producers—were caught flat-footed, had expected the hikes would be delayed until October. The pace-setter this time, incidentally, is the same maker who remained recalcitrant early last spring—after most competitors' customers had been told to expect an advance. Result of the holdout at the time: rescissions, withdrawal of increase notices, a three-month customers' respite from more costly chlorine.

But the holiday is over and chlorine users will pay about $58.60/ton for single unit tank cars; $76 to $80/ton for multi-unit tank cars in quantities of three to five or more cars a year. It's a safe bet, too, that most producers will up their schedules, go along now with the latest increases.

Playing follow-the-leader is fast becoming a standard procedure in the nation's market place. The only question raised: Which seller will lead the parade, toss out the first price-hike word? For, chemical producers say, all have been plagued with the same high-cost vs low-return blight.

That same pattern and reason also affects technical acetanilid prices. When one major producer (Sherwin-Williams) posted higher—by 2½¢/lb.—contract quotations to take effect July 1, another (Dow) followed suit almost immediately. Spot customers this week are paying 29¢/lb. (c.l., bags), a penny more for l.c.l.

And late last week ammonium sulfate producers posted prices for the upcoming fertilizer year (July 1, '53 - June 30, '54), with contract writing again prevalent. (The practice was generally discontinued during the price-control period.) Prices, for the most part, will remain at about previously established levels—along the eastern seaboard, $46; around Pittsburgh, $44/ton.

Here's the outlook for the coke oven fertilizer material. In the East and South, demand in some quarters is tapering off as mixers wind

WEEKLY BUSINESS INDICATORS	Latest Week	Preceding Week	Year Ago
CHEMICAL WEEK Output Index (1947=100)	126.4	126.6	119.0
CHEMICAL WEEK Wholesale Price Index (1947=100)	104.4	104.4	103.6
Bituminous Coal Production (daily average, 1,000 tons)	1,605.0	1,464.0	1,542.0
Steel Ingot Production (1,000 tons)	2,252.0 (est)	2,246.0 (act)	
Stock Price Index of 13 Chemical Companies (Standard & Poor's Corp.)	244.1	248.4	244.6

MONTHLY INDICATORS—Production (Index 1947-49=100)	Latest Month	Preceding Month	Year Ago
All Manufacturing and Mining	242	243	216
Durable Manufactures	327	328	277
Non-durable Manufactures	198	201	183
All Chemical Products	316	316	292
Industrial Chemicals	602	607	559
Petroleum and Coal Products	283	289	261

up the current season the end of this month. Supplies for the new year will probably be sufficient to fulfill demand in these areas, providing—some experts declare—foreign sulfate continues to come into this country in fair quantities to help ease Southern requirements.

The picture is somewhat different in the Midwest. At the moment, demand is still high. Prices—in contrast with the more steady East-South tags—will jump $2/ton (Chicago area) next month.

Reason for the dissimilar market situation: fertilizer mixers in the Midwest see a tight coke oven ammonium sulfate future, are now buying heavily as they prepare for fall business.

There's a butadiene shortage—and price rise—in sight, too. So warned Enjay and Esso Standard's Osgood Tracy at a meeting of the Chemical Market Research Assn. in New York last week.

With national butadiene requirements running near 691,000 short tons/year, Tracy pointed out that capacity of government and private plants currently totals a bare 637,000.

This supply-pinching position will help drive up the present Washington-pegged 15¢/lb. price when the government plants are sold to private interests. Reason: private enterprise will have to pay taxes, sales, and development expenses—problems of little concern to present owners.

On the other hand, acrylonitrile will get cheaper. But don't look for any lower price before next year. Another major plant now abuilding will be in operation then, and talk is that acrylonitrile price—now about 43¢/lb.—will lead down into the 30s.

And there's talk in the trade, too, that one big paint-making concern, now a steady epoxy resins consumer, is kicking around the idea of making these resins itself. To a CW query, the reply was terse, "We are still getting materials for the resins from our regular suppliers. Beyond that we have no comment."

If you've been trying to buy some flake caustic for $3.75/100 lb. (400-lb. containers), as stated here last week, chances are producers have told you that it's been boosted, too—along with the ground and powdered material—now lists at $4.10.

SELECTED CHEMICAL MARKET PRICE CHANGES—Week Ending June 8, 1953

UP

	Change	New Price		Change	New Price
Sulfur, com'l flour, bgs., mines, per 100 lb.	$ .25	$2.30	Acetanilid, tech., bbls., c.l. delvd.	$ .025	$ .29
Sulfur, refd., flowers, USP, bgs., mines per 100 lb.	.40	4.00	Sodium salicylate, USP, drms.	.05	.68

All prices per pound unless quantity is stated.



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for this 40-page Harshaw Book on Hydrofluoric Acid Anhydrous. It has been written to provide helpful data for you if you now use HF or are considering its use. We will gladly send you a copy without charge or obligation . . . just write.

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BRANCHES IN PRINCIPAL CITIES **THE HARSHAW CHEMICAL CO.** 1945 E. 97TH STREET • CLEVELAND 6, OHIO





It Hefts . . . . It Bends . . . . It Saws

It's the "hottest" item spouting from the dies of the thermoplastic extruders: plastic pipe seems destined to criss-cross the country. Hardly a week passes without news of an improved material or new use for synthetic "plumbing."

In the Far West, for instance, a new rigid plastic pipe is being installed in an oil field; it's expected to solve a troublesome corrosion problem in the cooling system for waste salt water disposal.

In a little town in Indiana, plastic mains are now a reality. Nearly a mile of recently installed 4-inch pipe is delivering city water to new houses built just outside the community of Haubstadt.

And the average householder is learning that he can now install a lawn or garden sprinkler system with no assistance nor tools except a hacksaw. Producers of the stuff are reaching out to thousands of home owners with a new semirigid pipe. Their de-





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cleared target: to turn the heretofore luxury of an underground system into a common convenience.

Solid Basis: These multiplying applications of plastic pipe are based on far more than mere novelty. The newer "glamor" thermoplastics, especially —polyethylene, butyrate, vinylidene chloride, styrene copolymers, reinforced polyester and, most recently, rigid vinyl—each offers important individual advantages.

Taken together as a group, though, they are rapidly gaining favor for several commonly held qualities:

• They're light, easy to handle. The relatively high-pressure pipe weighs only about one-sixth as much as its steel counterpart; a 20-ft. section of 3-in. pipe scales a feathery 12 lbs. And the low-pressure pipe is even lighter.

• Most of them are reasonably flexible. This is a big help where minor curves (*see picture*) can be snaked by without the use of angle couplings. Threefold savings accrue: fewer fittings, less installation labor, and lower friction losses.

• They are readily assembled. Lengths are rapidly joined with slip-sleeve couplings and a cement that permanently welds connections. In one test installation on a home sprinkler system incorporating 13 sprinkler heads spaced 10 ft. apart, one man laid out the system, joined the sections and tested it prior to trenching —all in less than an hour. Elsewhere, in an industrial trial, three men—using only two saws as tools, two paint brushes and cement—laid 400 ft. of 14-inch polyethylene pipe in 14 minutes.

• They have superior corrosion resistance. This property varies with the particular conditions of operation, and no sweeping generalization will cover all types. But with a half-dozen or more to select from, an engineer can usually find a plastic to match the specific need. The obvious gain is, of course, the saving on maintenance and replacement costs. A hidden added value: the ever-smooth inside walls keep pumping costs to a minimum, increase throughput as much as 30% over that of corresponding diameters of steel pipe.

Some Hurdles: As matters stand today, the plastics are still a long way from entirely displacing metal pipe. Some limitations in present products may eventually be eliminated; some, inherent in thermoplastic material, may drag on indefinitely. Compared with steel, their weaknesses show up this way:

• They cost roughly twice as much as steel. However, following the present trend, the plastic-steel price gap continues to narrow (though the two may never bear the same tag).

• Their temperature range is seriously limited. Most cannot sustain over 170-180 F. As it looks now, the best bets are the reinforced polyesters; depending upon the particular resin-reinforcement combination, they'll work at 250 F, some even higher.

• Broadly speaking, they have low bursting strength. But at least one of the newer type, available in ½- to 4-in., can handle working pressures up to 500 p.s.i.

How Far? Just how much of the billion-dollar steel pipe market the plastics can snare may turn upon a single factor: price.

Currently, sales of all plastic pipe might aggregate some $15 to 20 million annually, up from a scratch start about five years ago.

That the plastics will continue to move into special application fields, e.g., corrosion resistance, seems certain. However, if plastics displaced all special pipe such as alloy, it would still capture only some 15% of the total process pipe market.

To cut into the remaining 85% of standard construction material sales, the plastic pipe manufacturers must make out a solid case based on cost alone. Armed with such arguments as lower installation and maintenance costs, they may be able to make a strong bid for a substantial part of this bigger field.

Ceilings Off, Floors Up

By this week, chemical buyers, contemplating market place events of the past several weeks, may well have jumped to the conclusion that they have been taken in by smooth-talking sellers. For despite the post-control assurances that chemical prices would remain fairly steady in a "free" market, this reflection is becoming increasingly clear to price-conscious purchasing agents: lifting the ceilings seems to have also raised not a few price floors—especially under the most needed, basic chemicals.

For example, new higher tags have been written recently for such mainstays as sulfur, the mineral acids (sulfuric, muriatic, phosphoric, nitric), benzol, soda ash, salicylates, boron minerals (boric acid, borax), among others.

And within the next couple of weeks, contract customers will be shelling out more for such items as anhydrous ammonia, solid caustic soda, chlorine, nitrogen solutions, phosphates, chromic acid.

The list, by no means complete, highlights this significant fact: jacking up the price of a basic chemical commodity invariably presages higher levels for dependent, derivative products.

Onward and Upward: Take soda ash, for instance. The 10% increase that went into effect early last month is reflected in higher schedules on many products. First to feel the soda ash nudge were trisodium phosphate and tripolyphosphate, whose major outlets are in the synthetic detergent and soap fields. The increases amounted to about 20¢/cwt. Though relatively small, the hikes may mean that higher prices are in store for detergent and soap users.

Anhydrous sodium sulfite, an important photographic material, also was boosted (50¢/cwt.) because of the soda increase.

And bichromates, used largely in dry color manufacture and for tanning, will cost ½¢/lb. more on July 1. The chromate prices, steady for the most part since the beginning of the year, are being raised for the same reason. It's a safe bet that other sodium compounds still at the old levels will soon cost more.

Yellow Grand Dad: When sulfur prices were "decontrolled," major producers almost immediately upped their schedules. The new postings by the top two concerns in the field, Texas Gulf and Freeport, set the higher industry level. The former's prices — pegged under other producers' during the control period—leapfrogged over Freeport's domestic figure—$26.50/ton vs $25.50 (at the mine).

But the impact of higher sulfur tags —delayed for several weeks—is finally being felt by sulfuric acid consumers. The increases, announced and contemplated, range between $2 and $3/ton. What these new prices will mean to the chemical process industries is not too difficult to guess—manufacturing costs will be boosted. More than 75% of the sulfur mined in this country winds up in sulfuric, and the acid is used at one stage or another in the preparation of nearly all chemicals.

One particular outlet, fertilizers, now consumes 35-40% of current sulfuric production. Reasonable assumption, therefore, is that superphosphates, both regular and triple grades,

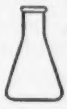
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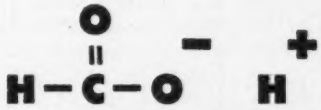
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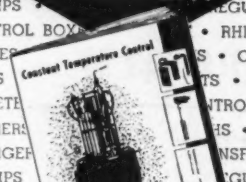
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MARKETS . . . . . .

will cost more—and soon. Petroleum, iron and steel, paints, pigments, rayon, battery acids, industrial explosives and a host of other industry cost curves will swing upward because of the new sulfuric prices.

One instance where price advances are, in part at least attributed to the higher acid occurred last week. Aluminum sulfate, up 20¢/cwt., now bears these spot prices: commercial grade, $1.85/cwt. (c.l.); $2.25 for l.c.l. Ground in bags, carlots, the material is pegged at $37/ton, and in lump form in bags it's $40. All prices are f.o.b., the works. Contract purchasers will pay the same beginning July 1.

The rash of higher prices will be further aggravated as ammonia users feel the rub of upped producers' schedules. Paced by Spencer Chemical's new $85/ton (tank cars) and Mathieson Chemicals' $88, other ammonia makers are expected to follow with increases of their own. Result, of course, is that consumers will pay more all along the line. Already, nitrogen solutions are up a dollar a ton, and ammonium nitrate fertilizer tags are now approximately $6/ton higher.

And so the pattern goes. Benzol schedules are raised—up climbs the chlorobenzenes tri, para, ortho. Looming increase for chlorine may well be likened to a pebble dropping into a pond. The price-hike ripples will affect solvents, paint removers, chlorinated ethylene products, insecticides, disinfectants, etc., ad infinitum.

But Why? The reason behind most of the price increases is fairly obvious. Back in early spring, when price ceilings and inventory controls were coming off, many sales managers were honestly declaring that there would be no great rush to raise prices. It was understood, they added, that a few items long held in the profit-pruning squeeze between controlled ceilings and unfettered costs—labor, freight, raw materials—would be adjusted, brought back in line.

And it is no comfort to the chemical buyer to know that he is being hit with "accumulative" adjustments. For, explains the sellers, had there been no controls, prices of their products would have been gradually increased as manufacturing costs went up.

Moulding Less Muddled

Shell-molding stakes are high enough to be worth the anticipated long legal fight over patents and royalties. For regardless of the jungle of patent confusion the resin makers are now fighting through, they see ahead a bright clearing for the shell molding resin market. Requirements for the current year, estimated at from three to six million pounds, could expand tenfold or more in the next five years.

One Less Cloud: Last week another binder was officially removed from the patent-swaddled (*CW, Aug. 23, '52*) market. W. W. (Bill) Knight, Jr., general manager of Libbey-Owens-Ford Glass Co.'s Plaskon Div., disclosed that L-O-F is licensing its Patent No. 2,422,118 royalty-free to foundries "to encourage the use of this improved method of casting."

Although the foundry industry has evinced much interest in the new industrial resins, the patent haze surrounding the application of these processes has deterred more than one would-be user. Plaskon's move, according to Knight, is intended "to provide every possible service to customers and potential customers." Its immediate effect will be to bring peace of mind to foundrymen who have either (1) been hesitating to tackle the puzzle of possible infringement or (2) have been reluctant to switch to the resins for fear of prosecution.

The Plaskon patent, however, covers particularly the methods of using urea resins in the casting of light metals; it does not extend to the casting of the heavier metals.

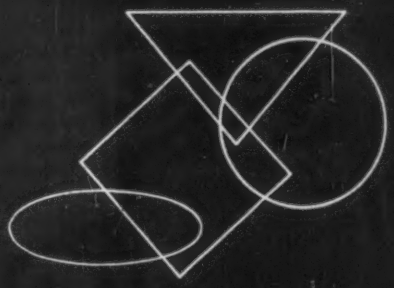
Croning Confusion: In the broader field of shell molding, however, the market picture still remains clouded by a solid overcast of patent confusion. Nub of the controversy: the German (Croning) patent for the process of shell molding either (1) is or (2) is not owned by the U.S. government.

The confusion, broken down into separate issues, involves:

- whether the process itself is public property, and thus usable by any company royalty-free;
- whether the later, American-patented improvements on the process are such that the process can't be used at all without them;
- whether certain claimants on refinements or techniques are entitled to royalty payments on their specific refinements or equipment, if used.

Right now, some firms, believing that the method is public property, are using the process royalty-free.

Others, playing the game more cautiously, are paying royalty to Crown Castings Associates, of Boston, the U.S. assignee of the German inventor, Johannes Croning.



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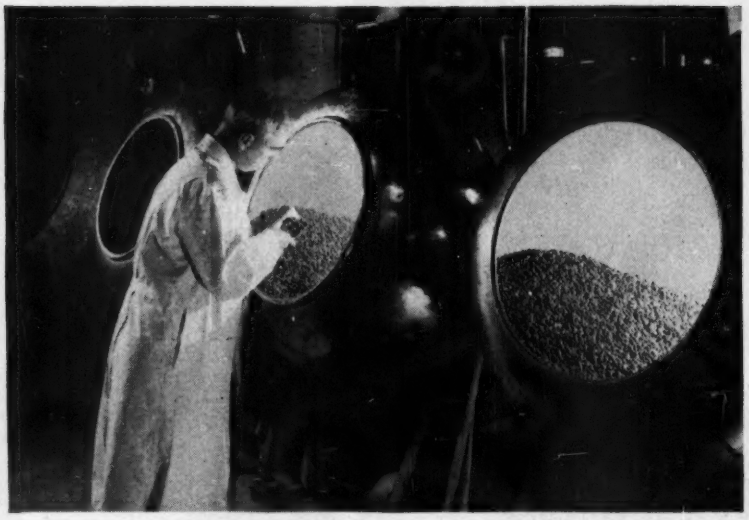
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Still Spring for the Green

A winter with some discontenting publicity apparently hasn't wilted sales and production of chlorophyll products.

Medicinal forms, new industrial applications are selling well, according to producers. But some "fringe" products have dropped out.

The negative publicity put a chill on some hyperecstatic promotion—has spurred further research.

Ever since "chlorophyll" began receiving attention as a deodorant in everything from moth crystals to shoe insoles, many observers looked for the moment when the bubble would burst. And some thought they heard the report of its bursting last December at Alsoph Corwin's address before the New York section of the American Chemical Society.

But a recent sampling of the industry now indicates that despite the bad publicity chlorophyll received last winter, many chlorophyll-derivative products survived the season without a noticeable slump in sales.

Industry consensus: the past winter's events support the axiom that any publicity is good publicity. And there's no question but that criticism tended to sober some flamboyant advertisers who were intoxicated by the promotion possibilities of chlorophyll-based products.

It wasn't the ad men, though, that Corwin took to task as much as researchers who rushed to offer up what Corwin felt was insecurely grounded test work. His point on the need for further statistically controlled investigation was seconded by a number of others dealing with chlorophyll.

What the public heard, however, was Corwin's expression of doubt whether chlorophyll derivatives have any properties of deodorization at all —that, and his suggestion that the possible hazards in the use of metallic salts of chlorophyll are incompletely investigated.

The latter point—of possible danger in use of chlorophyll-containing products—was gleefully picked up by the press, and given large play in a number of major papers. Corwin later clarified his position on this, but his elucidation hardly got the notice his first remarks received.

Another jab at chlorophyll appeared in the March issue of the *British Medical Journal*, which reported the work of Dr. J. C. Brocklehurst, who had found that methyl mercaptan was not deodorized by chlorophyll in the experimental setup he used.

Plenty of Pro's: In response to the Corwin and Brocklehurst papers, several researchers have come out with work explicitly designed to refute their arguments, and the flow of reports favorable to chlorophyll derivatives has in no wise slackened. Typical of the papers answering the critics are an address by William Mitchell reprinted in the April issue of the British journal, *Manufacturing Chemist*, and Joseph Harrisson's report in the May *Drug and Cosmetic Industry*.

Basic suppliers of chlorophyll derivatives in this country—Archer-Daniels-Midland, National Alfalfa, Strong Cobb—have stepped up research, as have foreign chlorophyll producers. A-D-M, among others, will publish its research data within a few months.

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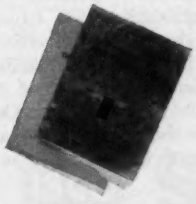
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ican Chlorophyll Div. of Strong Cobb & Co. (Cleveland) has begun a series of ads in leading papers in an effort to reassure the layman of the efficacy of water-soluble chlorophyll derivatives as deodorants, tissue healers.

On the Market: While the scientists were battling it out, makers of chlorophyllin-containing products had other things to worry about. Even without the raps from some researchers, it was becoming apparent that mention of chlorophyll didn't guarantee sales.

And the squabbling apparently affected sales of some products. In some areas, chlorophyllin-containing dog foods suffered a short setback. With many products, it is some time before changes in consumer attitude are felt by manufacturers. Such is the case with dentifrices; whether or not the criticism of chlorophyll affected sales is hard to determine, and a matter that the industry doesn't appear to be in agreement on.

According to Rystan, leading makers of pharmaceuticals with chlorophyll derivatives, there's no drop in sales of their products that can be attributed to a change in public reaction toward the green compound.

As for the tablets and gums used for deodorization, one leading maker reported a slight dip in gum sales about the time of Corwin's talk, but was not convinced that the criticism had much to do with it. Otherwise, sales of the anti-odor pills reportedly are high.

Airkem, Inc., perhaps the foremost in industrial application of chlorophyll, reports that its chlorophyll products have been moving smoothly. Airkem uses chlorophyll, in conjunction with numerous other compounds, in its industrial odor control service; its best known consumer product is Airwick, space deodorant.

Ad Man Out: Although industry personnel seems to keep faith in the sales potential of chlorophyll, there's some indication that advertising men figure chlorophyll as an advertising point has shot its wad. *Tide* magazine recently conducted a poll among 200 agency men, reported that only 6% felt that the green stuff would be featured in next year's campaigns.*

"We could do without some of that promotion baloney," declared one maker of dentifrices. "We haven't been exactly shy about advertising ourselves, but I feel our position is a hell of a lot firmer than that of the guys making chlorophyll socks. Outfits like that are the ones that damage the reputation of the business as a whole."

* An incidental point here is the ad in a Norwegian publication that featured "the clean white toothpaste without chlorophyll."

British Logic

Seems as if the British magazine, *The Chemical Age*, forgot the bombastic promotion history of Pears Soap, which for years set the pace in soap sales campaigns. The journal recently had this to say about American refinements on the old Pears techniques:

"There appears to be no limit to the lengths to which some present-day manufacturers will go to increase the sales of their products. Few people can have failed to notice in recent months the intense competition that has developed between makers of detergents and washing soaps. The tempo of the battle has now been increased by adoption of the methods used by American firms . . . with the result that free samples . . . offers of motorcars, motorcycles, television sets . . . even 'dream' houses are being regarded as commonplace inducements . . . Thousands of free gift vouchers are sent to housewives weekly. We cannot but regret the adoption by British manufacturers of these American methods of high-pressure salesmanship, with their resultant unwelcome addition to the already heavy load on the Post Office and waste of the public's time. Surely there must be a simpler, more logical and more 'British' solution to the problem."

Restless Wait

Chafed by the wait for a decision from the Court of Appeals, Fifth Circuit, in New Orleans, Schwegmann Bros., the anti-fair trade supermarket, has tried a new angle to keep up fire on price-fixing.

In its usual weekly ads, it reserved some space recently to show a "few of the crimes we committed." With that, it listed pharmaceutical products and their manufacturers, gave the Schwegmann price against the manufacturer's tag. Current court order prevents Schwegmann from selling his products below the "fair trade" prices posted by manufacturers.

•

Summers in Sioux Falls: Summers Fertilizer Co., Inc. (Baltimore, Md.) has completed plans for its tenth unit, a new 25,000 ton/year mixed fertilizer plant in Sioux Falls, S.D. The 30,000-sq.-ft. facilities are to be located on a 10-acre tract, are due in production by October.

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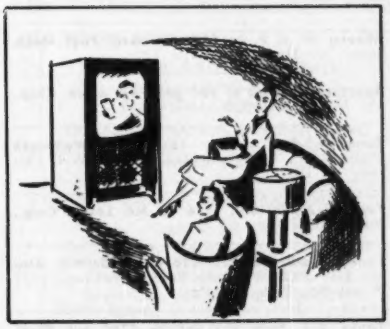
Tubed Sticker: Barge Cement Mfg. Co. (Towaco, N.J.) is now selling its neoprene-based cement for household use. Offered industrially for a number

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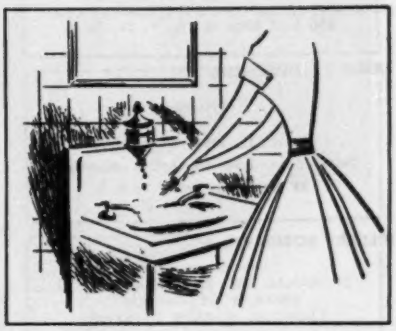
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No Scum: Ames Laboratories, Inc. (South Norwalk, Conn.) is offering a new compound claimed to prevent paint from skinning over in the can. Paint-Sav, as it is tabbed, is added to the opened container of paint just before it is stored (dosage about half an ounce per quart). The mobile, colorless liquid is said to inhibit oxidation in the can, but to evaporate when paint is used, and thus not interfere with the drying. Packed in 2-oz. bottles and larger-size cans, the material is being introduced through Sears, Roebuck & Co.

•

Fivefold Dose: Winthrop-Stearns Inc. (New York) is introducing a new therapeutic vitamin capsule called Pluraxin, which contains approximately five times the adult maintenance allowance of the various vitamins. The capsules are recommended in such emergencies as severe burns and injuries.

•

Name Change: Acheson Dispersed Pigments Co. is the new name for the printing ink supplier formerly known as Peerless Printing Ink Co. The Philadelphia firm is a unit of Acheson Industries, Inc.

•

Attapulgus Adds One: Attapulgus Mineral & Chemicals Corp. (Philadelphia) is now selling Attasorb, a low-cost mineral powder. Claimed to be extra-fine and to possess high sorptive powers, it is suggested as a polishing agent for polishes, and as a flattening agent and pigment extender for paints.

•

Hold Tight: Adhesive Products Corp.

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SPECIALTIES . . . .

(New York) is now selling a waterproof, transparent adhesive called Vinyl-Grip. The new glue was developed to adhere saran and vinyl plastics.

•

Pressure Lube: Carlisle Chemical Works, Inc. (Reading, O.) is now making a chlorine-bearing aliphatic chemical additive for extremely heavy-duty lubricants. The new product, Alpha-Chlor 33, is available in quantity. Carlisle suggests possible uses as a fabric flameproofer and resin plasticizer in addition to its lubricating applications.

•

Conditioner: Bell-Ray Chemical Corp. (Milwaukee, Wis.) is now selling a new phosphate metal conditioner tabbed Chem-Bond. The new material is claimed to give a paintable surface in just one application.

•

One Wet Only: Atolene NR is a new textile chemical introduced by Dexter Chemical Corp. (New York). The compound is a wetting agent, dye-leveler, and dye-bath lubricant claimed to have no rewetting action.



Double Duty

MOTHS AND MOISTURE are said to be licked by a new product made by G. N. Coughlan Co. (West Orange, N. J.) and demonstrated by model Barbara Elliott. The unit holds two seven-inch paradichlorobenzene discs, as well as a dehumidifier (treated diatomaceous earth). The para cakes can be replaced, and the dryer rejuvenated by removing discs and oven-heating the unit.

Consult SCHUTZ-O'NEILL

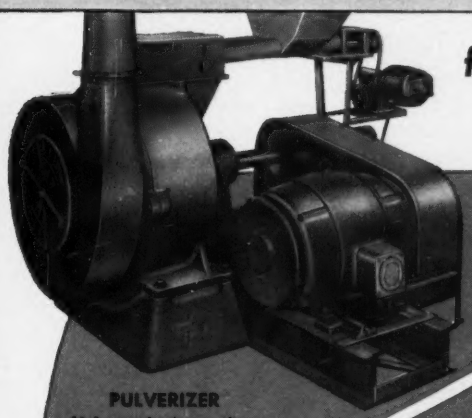
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GRANULATE

CLASSIFY *BY AIR*

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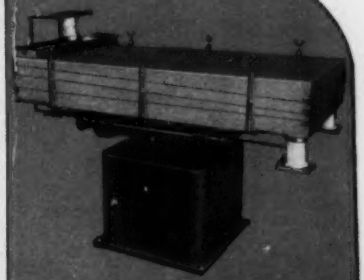
PULVERIZER
Air force pulverizer produces particles from 40 mesh to low micron sizes. Easily adjustable.



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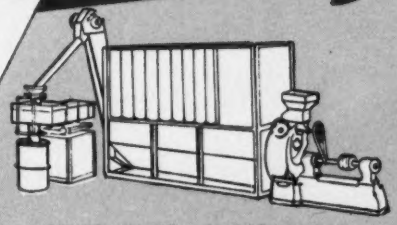


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Absolute air classification—no moving parts. Classifies and separates fractions ranging from 1 to 100 microns.



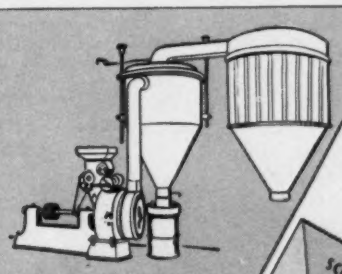
GYRATOR SIFTER
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Consult SCHUTZ-O'NEILL *Engineering Service for Mill Plans*

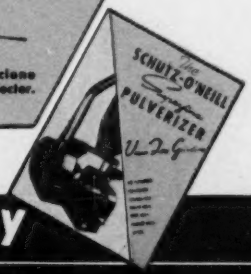


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Illustrated here are two from a large variety of Mill Plans, suggesting efficient operating setups for any material or plant layout. If you will advise us of your requirements, Schutz-O'Neill Engineers will recommend a suitable mill plan and equipment for your own use.



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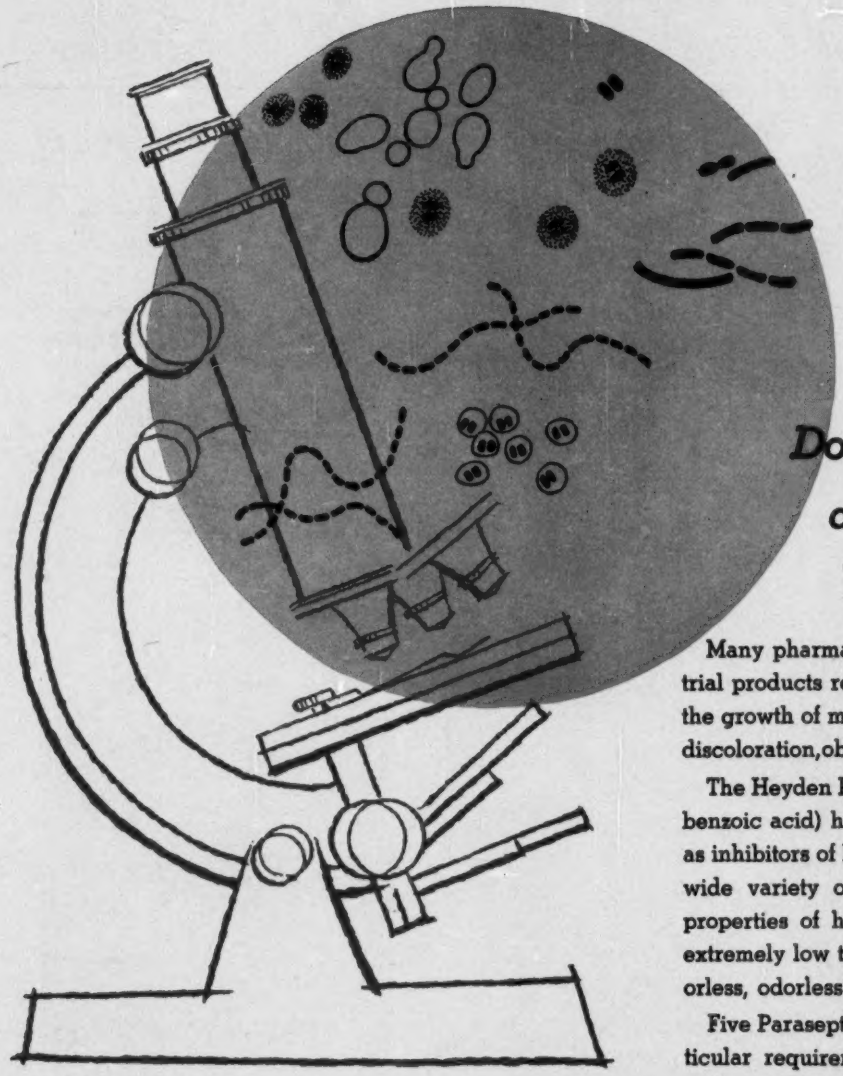
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